Lesson Plan – Number Sense

Introduction

This scene visually introduces the student to the concept of Number Sense. Number sense is the ability to take a hard maths problem and turn it into an easier one by using numbers flexibly. As an example, if a student understands that 12 is made up of 10 plus 2 then the 12 times table questions can all be solved by adding the 10 times and 2 times tables together. A lot of students' stress over remembering the 12 times tables whereas they all quickly learn the 10 times and 2 times tables. Once they understand the relationship between 10,2 and 12 times the stress goes away as they can easily solve any 12 times problems.

The objective of this session is for each student to understand that quite often the best way to solve a math problem is to deconstruct it into easier calculations and then reconstruct the parts for the answer. In the case of the harder Times Tables, there is often 2 easier calculations that when added together give the solution to the harder problem. It is much easier to train the brain to spot these relationships than it is for it to remember math facts like 7x7=49.

In her book, "Limitless Mind", Jo Boaler refers to some research by two British professors on students aged between and 7 and 13. The found that the difference between the high and low performers in maths was the ability to engage with numbers flexibly. Most of high performers had Number Sense whereas none of the low performers had learnt this skill. The only skill the low performers had was to count all or count on. The results demonstrate that teaching students the skill of Number Sense at an early age should be a high priority for all educators.

The students will be very thankful for having the skill of number sense when they move onto more advanced multiplication. As an example, there are numerous ways to solve 18 times 4. A student with number sense will tell you very quickly that the answer is 72. If asked what number sense strategy they used to solve it, they will easily explain it. If you then asked for alternative strategies, they could give explain another 2 or 3 ways they could have solved it. A student that has this level of competence in number sense will likely become a high performer in overall math competence.

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Learning Outcomes

- Each student grasps the concept that maths problems can often be solved a number of different ways, some of which will be easier than others.
- Each student grasps the concept of number sense, being the ability to use numbers flexibly to make harder maths problems easier ones.
- Each student can deconstruct the harder times tables questions into 2 easier times table questions and add them up.

Resources Required

- The App on a device
- Overhead projector or TV Monitor connected to the device (if teaching in a Group)
- Paper and pens/pencils for students
- Carboard for posters
- Coloured pencils, markers or crayons

Scene

- This activity involves watching the "Number Sense" scene. After login, select the "Introduction" button followed by the "Number Sense" button.

Lesson

Time	Task
20 mins	**<u>Key Concepts</u>** Select the "Number Sense" Button and watch the video (5 minutes). At the conclusion of the video, ask the student/s: **"What were Kylie the Kangaroo's key messages within the video?"** Responses should include but not be limited to: - Math problems can often be solved a number of different ways - You can split calculations to make a harder maths problem two easier ones and then add them together for the answer

	- 7 Times is the same as 5 Times plus 2 times - 4 Times can be solved as 2 Times plus 2 Times - Number sense is the ability to make a harder math problem an easier one by using numbers flexibly.
30 mins	**<u>Exploring Multiplication</u>** This activity can be done as individuals or in groups of up to 4 students. "It's now time to explore the concept of number sense which is the ability to use number flexibly to make a harder math problem an easier one. You task is work out an easier way to solve 6 times, 11 times and 12 times using number sense and splitting them into 2 easier calculations. You have 10 minutes to work out alternative ways. Ask each student or groups to present back one of their number sense examples. With each solution ask: - What 2 numbers make up 6, 11 or 12? - How can the relationships between these numbers be used to calculate the 6, 11 or 12 times tables? - If we were asked to solve 6x4, 11x4 or 12x4 can you show how we could use number sense to do this (do this on the board as a class)? Wrap this activity up by asking the student/group: - Do you feel you could look at the harder times tables problems and use number sense to solve them? - In order to use number sense for the harder times tables which of the easier Times tables do you need to remember? - How much longer does it take to solve the times tables this way rather than have to remember

	them all? With some practice how quicker do you think you will get? - Do you think number sense will also be a useful skill when you move onto harder multiplication?
20 mins	**<u>Creative Activity</u>** (1) Hand out the carboard to each group and ask them to create a colourful "Number Sense Poster" that demonstrates how you could solve either the 6, 11 or 12 times tables. Some ideas for what to include on it are: - A 6, 11 or 12 times table problem to solve - A visual representation of that problem - A visual representation of how best to solve that problem using number sense - The solution to the problem - Kylie the Kangaroo - Anything else that could add to the creativity (2) If done in groups, have someone from each group talk through their completed poster.