

Compensation Strategy

Parent Information Sheet

The information on this sheet is designed to help you gain a better understanding of how to help your child with maths education at home.

Junior primary school students need to develop flexibility with the way they think about numbers and problem solving. At school, this is often called 'number sense.' Students who develop a strong number sense in junior primary school are more likely to be confident maths learners who find enjoyment in mathematical problem solving.

This worksheet is part of a series exploring subtraction solving strategies. Ideally, students should feel comfortable using many different strategies when approaching a subtraction problem. This will allow them to choose the strategy they believe to be most appropriate. If one strategy is not working they can be flexible and simply switch to a different strategy, instead of giving up.

You might even find a strategy that you'd like to use more often for your own mental maths. Most of the mathematics we do as adults is mental maths; shopping, banking, weather, timetables, distance and cooking all require constant mental maths. We're never too old to develop a stronger number sense and expand our own toolkit of mental maths strategies. So enjoy working on this activity together with your child. You will both benefit from the experience!

Overview

BioLAB is a Victorian Science and Mathematics Centre of Excellence. Our theme for engaging students in maths and science is sport and human performance. Subtraction problems are everywhere in sport! For example, an AFL coach may want to know how many times they can swap players on the interchange bench in the last quarter. They need to subtract the number of swaps in the first three quarters from the total swaps allowed per game in the AFL rules. For example: 90 (total swaps) minus 65 (swaps so far), equals 25 swaps allowed for the last quarter.

Subtracting two digit numbers can be tricky! Many students in grade 2 and 3 find it tricky to subtract two digit numbers. These same students might find addition of two digit numbers much easier.

Often, when we are starting out, the numbers don't look very 'friendly'. We can make numbers friendlier by using the compensation strategy for subtraction. This activity aims to give students practice in using the 'compensation' strategy. It is one of many strategies students may find helpful when solving subtraction problems.

Learning Intention

Use compensation to change the numbers in a subtraction problem to make it easier to solve.

Success Criteria

I am able to demonstrate how to use the compensation strategy to change numbers in a subtraction problem to make it easier to solve:

- I am able to change one of the numbers to make it a friendly anchor number
- I understand that I must compensate for this change by making the same change to the other number before solving the problem

Compensation Strategy

First of all, what does 'compensate' mean? Basically, if we make a change to one of the numbers in our problem then we need to compensate, or make up, for that change somewhere else in the same problem. There are a few ways this can be done. In this activity we will focus on making the same change to both numbers before solving the problem.

Friendly numbers are awesome! They make life so much easier. How can we make a change to the numbers in a subtraction problem to make them friendlier? It's actually pretty easy after some practice. Let's take a look.

As an example, let's focus on the problem 64 subtract 39:

$$64 - 39 = ?$$

That 39 might look pretty horrible to many junior primary school students. If we try to subtract the 'ones' we have 4 ones take away 9 ones which makes life difficult. We would need to regroup the 64 to solve this using a traditional vertical algorithm:

$$\begin{array}{r} 5 \quad 14 \\ \cancel{6} \quad \cancel{4} \\ - \quad 3 \quad 9 \\ \hline \quad ? \quad ? \end{array}$$

What if we could change the problem to this:

$$65 - 40 = ?$$

That looks a lot friendlier! Many students might even be able to use mental maths to solve this problem without a pencil and paper now. So how did we change the problem?

$$\begin{array}{c} +1 \qquad \qquad +1 \\ \swarrow \qquad \searrow \\ 64 - 39 \end{array}$$

becomes

$$65 - 40 = 25$$

To make 39 a friendly number we can simply add 1 to make it 40. In a subtraction problem we need to compensate by doing the same thing to the other number in the problem, so we also add 1 to 64 to make it 65. We have increased both numbers by 1 each, so the difference (or distance on a number line) between the numbers stays the same. It is the difference between the numbers that we are trying to find in a subtraction problem. For subtraction, we do 'the same' thing to both numbers.

Let's take a look at another subtraction problem:

$$\begin{array}{r} -2 \qquad \qquad -2 \\ \swarrow \qquad \quad \nearrow \\ 61 - 42 \end{array}$$

becomes

$$59 - 40 = 19$$

This time we have taken 2 away from 42 to make it 40, a much friendlier anchor number. When we take 2 away from 42 we need also need to take 2 away from 61. This means the difference (distance) between the numbers remains the same, but we have a much friendlier problem to solve.

Student Activity

The attached page has a range of problems for your child to solve using the 'compensation' strategy.

Before starting the student worksheet, show the above examples to your child. You may like to write them out on a separate piece of paper and explain the strategy to them. When you think they are ready to try it for themselves, you can introduce the worksheet.

Your job is to sit down with your child to provide support. Resist the temptation of providing answers. You might want to use some leading questions such as:

- "Which number is making this subtraction problem difficult to solve?"
- "If we change that number, why would it be easier to solve?"
- "Have we remembered that we need to make the same change to the other number (the subtrahend) before solving?"
- "Why is it important to change both numbers?" (answer: keep the difference between the numbers the same when solving)

Enjoy helping your child to strengthen their number-sense!

Many grade 2/3 students will need to use a pencil and paper. This is normal and should be encouraged. Eventually they might use this strategy performing mental maths without a pencil but there is no hurry for this. This should not be viewed as a once-only activity. Come back and re-visit it with your child. Keep on developing their number sense!