

SURF

Mental Maths and Problem Solving Program

LESSON PLAN FORMAT

Name: James Russo

School: Belgrave South Primary

Topic: Rainbow Facts (and Equals Sign)

Learning Area: Fast Facts (and Reading)

Date: 14th and 15th August

Year Level: Grade 1/2 (Group 1)

Duration: 55 minutes

Learning Purpose: For students to understand why rainbow facts work through connecting the concept of the equals sign as meaning 'the same as' to the tens facts. To improve students' fluency with rainbow facts. To introduce students to the notion of complements to 20.

Australian Curriculum references:

Year 1: Represent and solve simple addition and subtraction problems using a range of strategies including counting on, partitioning and rearranging parts.

Year 2: Solve simple addition and subtraction problems using a range of efficient mental and written strategies, such as ten facts.

| | Gro up set up | Mate rials |
|---|----------------------------------|--|
| <p>LESSON 1: Rainbow Facts and Complements to 20</p> <p>Review: What do we know about the equals sign? What do we know about the plus sign (both under Reading).</p> <p>5 minutes</p> <p>Engagement (whole group):</p> <p>Discuss how the focus of the lesson today will be on Rainbow Facts and complements to 20.</p> <p>Select 10 student volunteers; on one whiteboard, write a plus sign, on another, an equals sign, on another, write the number 10. Organise student volunteers into different combinations. Record the relevant ten facts as we go. Discuss with students how the whole never changes – there is always 10 students; but the size of the two parts is changing.</p> <p>Use the following EWB resource to demonstrate how a 10's Frame can be used to find Rainbow Buddies. For example, if we have 6 counters on a tens frame, 4 blank spaces remain, so we know that the 6's rainbow buddy is 4.</p> | <p>Indiv idual</p> | <p>Coun ters/ Tedi es Work book s White board 10 frame s abac us</p> |

<http://illuminations.nctm.org/Activity.aspx?id=3565>

OR

http://www.curriculumsupport.education.nsw.gov.au/countmein/children_butterfly_tens_frame.html

15-20 minutes

Procedure:

- Grab ten counters or teddies and one tens frame. The students' job is to model and record in their workbooks all of the addition rainbow facts.
- If students finish this activity, consider providing them with access to the extending prompt (complements to 20) or allowing them to play a game of 10 snap.

20 minutes

Pulling it together:

Whole group: Discuss the results of student investigations. Go over the idea that, for our rainbow facts, the parts change (the operands), but the whole (the sum) always stays the same. Finish by asking students. 'My whole is 10, what might be my parts?' and 'My whole is 20, what might be my parts?'

10 minutes

Time permitting, play a game of Gotya. Students spread out around the room standing up. Once they have found their spot, they cannot move or talk (or they are out). The teacher points to a student and ask questions such as "I am 6. Who is my rainbow buddy?". If the student is correct in their response, they can take one step towards another player and attempt to tag them. If the student manages to tag a player, that player is out (they have to sit down). Normally, if the student can articulate their strategies/ thinking clearly, they can take 2 steps. However, given the focus is fast facts, the decision to award students 2 steps can be based on the speed of their response.

The teacher can provide opportunities for those students who have earlier gone out to come back in the game by asking them questions. Generally I give this opportunity to students sitting quietly on the floor. If they come back into the game, they get to stand up again (but not take a step towards another player).

The game is played at a rapid pace (as much as possible, given that some students require more thinking time).

Last person standing (if you managed to get that far) is the winner.

LESSON 2: Rainbow Facts and Complements to 20

Review: Discuss yesterday's rainbow facts lesson. See if students can rapidly recall rainbow facts. Model the lesson with an abacus and/or using an interactive tens frame:

<http://illuminations.nctm.org/Activity.aspx?id=3565>

OR

http://www.curriculumsupport.education.nsw.gov.au/countmein/children_butterfly_ten_frame.html

5 minutes

Engagement (whole group):

Having the teacher play a game of 10 snap against a class member, or the whole class. If you want to play against the whole class, consider using the following link:

<http://www.random.org/playing-cards/?cards=2&decks=5&spades=on&hearts=on&diamonds=on&clubs=on&twos=on&threes=on&fours=on&fives=on&sixes=on&sevens=on&eights=on&nines=on&remaining=on>

Zoom in to make the picture of the cards bigger (I could not find a better resource online, although you may have more luck).

10 minutes

Procedure:

- Students can create a 'rainbow facts rainbow' (or consider extending prompt).
- Once students have finished their rainbows, invite them to play a game of 10 snap with a buddy (get students to remove all picture cards and 10's).

30 minutes

Pulling it together:

Whole group: Get students to share work and invite them to share a rainbow fact, or complement to 20 with the class.

10 minutes

Time permitting, play a game of Gotya.

Observations of students' learning: Student ability at the end of the session to respond with equivalent number facts. Student ability to generate a range of number facts during individual work.

Teacher's Resources: EWB.

Catering for inclusion:

Extending prompt (Lesson 1):

- Once students have finished this activity, give them an additional 10's frame, and 10 more counters. Their job now is to model and record in their workbooks all of the addition facts which

equal 20.

- Grab nine MAB 10's and ten MAB 1's. Working with a partner, or on their own, the student needs to create as many addition number sentences as they can using this total of MAB. Record the number sentences in their book as they go. Allow students to discover that they are in fact exploring compliments to 100 through physical modelling.

Extending prompt (Lesson 2):

- If a student is already highly confident with their rainbow facts, suggest that they create a complement to 20 rainbow.

Enabling prompt (Lesson 1):

- Focus on the conceptual element, and do not require students to right down number sentences. You could give students a list of numbers between 0 and 10 (perhaps on a whiteboard) and ask the students to find out these numbers rainbow buddies, and record their responses. Demonstrate to them how they can use a 10's frame to support their thinking (or allow them to use an abacus, if they are more comfortable with this).

Your reflection: Identify the pedagogical stance you took during the lesson and reflect on:

- what went well and why
- what was difficult and why
- how engaged the students were and
- what you did to encourage this
- what else you could have done to improve the students' learning
- how responsive you were able to be to the students
- what you learnt

SURF

Mental Maths and Problem Solving Program

LESSON PLAN FORMAT

Name: James Russo

School: Belgrave South Primary

Topic: 2-digit numbers

Learning Area: Reading

Date: 14th & 15th August (Lessons 37+38)

Year Level: Grade 1/2

Duration: 55 minutes x 2

Learning Purpose: For students to understand how to read numbers 11 to 99, specifically how:

- the English language makes learning the names of the numbers much more difficult than Asian languages (it should be three-ten six or three-ty six instead of thirty-six)
- how the teen numbers in particular are a bit crazy because they are back to front (it should be one-ty-three instead of thirteen);
- ; how 'ty' means ten, and how this can help us to make sense of our number system.

Australian Curriculum references:

Grade 1: Recognise, model, read, write and order numbers to at least 100, in particular, modelling numbers with a range of material and images

Grade 2: Recognise, model, represent and order numbers to at least 1000, in particular, recognising there are different ways of representing numbers and identifying patterns going beyond 100

For grade 2 students, the whole-of-group focus on reading 2-digit numbers, and understanding how the English language makes learning the names of our numbers challenging, can constitute revision and a deepening of their understanding.

| | Group set up | Materials |
|---|---|---|
| <p><u>Lesson 37</u></p> <p>Review: 5 minute review. Go through the SURF board briefly. Get students to discuss what each of the letters stand for. Briefly review rainbow facts.</p> <p>Engagement (whole group): Get three volunteers, give each of them a card with a number on them. Get these volunteers to go and quickly make their number using popsticks or MAB (with groups of 10). Go through each volunteer in turn and get them to state what lives inside their number (i.e., to state how they partitioned their number into tens and ones)? Then ask, how do we say this number? Numbers to choose: 43, 62, 85 (10 mins) Get students to think-pair-share – What do they think ty means (5 mins)</p> <p>Procedure:</p> <ul style="list-style-type: none"> • Activity (small groups). Working in groups of six, students are given one number each and are | <p>Need to decide how to structure groups of 5/6 and how to construct pairs.</p> <p>I might split each class into 4 groups based on their performance on Online Numeracy Interview.</p> | <p>Number cards (1-99)</p> <p>Sheet with random hundreds numbers</p> <p>Sheet with random thousands numbers</p> <p>100's boards</p> <p>Counters</p> |

instructed to make that number. Ensure that each group has at least two teen numbers, two numbers in the 20's, 30's or 50's and two other 2-digit numbers. Students then get into a circle in their groups, and say what their number is called and what 'lives inside their number'. 15 mins

Note: It is assumed that students have some knowledge of this, given that this is a revision lesson and that they have been introduced to friendly numbers.

Pulling it together:

Whole group: Discuss how in some languages (e.g., Chinese, Korean) what lives inside the number and what the number is called are always the same thing. This is sensible. But is this the case in English? Do all our numbers follow the same pattern? Get students to think about which numbers don't follow the number-ty-number pattern. Does the number they have on their card follow the pattern?

Mark out the classroom into two areas. Sensible numbers and crazy numbers. Get students to decide which half of the class they belong to. Once students have made up their minds, target students and ask them to explain why they think their number is sensible or crazy. Support students in their explanations. Discuss how the teen numbers are clearly crazy because they are back-to-front.

Play a game of 'crazy buzz'. This game works like a normal game of buzz, however every time students get to a number which does not follow a sensible pattern (e.g., eleven should be one-ty-one; twenty-one should be two-ty-one; thirty-three should be three-ty-three; forty-four is 'sensible', as are all the other numbers in the 40's; fifty-five should be five-ty-five etc). Basically, all numbers up to 60, except for those numbers in the 40's and those numbers between 1 and 9 are crazy, so kids will be making a lot of crazy faces.

20 mins

Lesson 38:

Review

Whole group review: Remind students that last class what about how we say 2-digit numbers, and how some of our numbers are sensible, and how some are crazy (and how some are 'a bit crazy' if this third category comes up – e.g., numbers like 26). Remind students that in some Asian languages – all the numbers are sensible, but English has some crazy numbers because English is a crazy language.

| | | |
|--|--|--|
| <p>5 mins</p> <p>Engagement (whole group)</p> <p>Select 10 volunteers, and give each a number card (different numbers to the previous session). Get volunteers to decide whether or not their number is crazy, and go and get them to stand on the appropriate side of the classroom. Get volunteers to explain to the class why they made their choice.</p> <p>10 mins</p> <p>Procedure:</p> <ul style="list-style-type: none"> • Activity 1 (pairs). Give students a 100's chart and some counters. Their job is to place a counter on each number that is crazy. Once participants have completed this activity, they can move on to Activity 2. • Activity 2 (pairs). Give students a sheet with some random hundred numbers. Get students to work out which numbers are crazy, and to place a counter on these numbers. Early finishers can move on to Activity 3. • See extending prompts for extension ideas. <p>20 mins</p> <p>Pulling it together:</p> <p>Review activity. Mark out the crazy numbers on the SplatBoard or interactive whiteboard. Get students to pair up with their buddy. Their job is to turn all of the crazy numbers into sensible numbers by saying them in a sensible way (e.g., thirteen becomes one-ty-three; thirty six becomes three-ty-six). Model first.</p> <p>Play a game of 'Chinese buzz': Basically, this is the same as regular buzz (i.e., multiples of ten are the buzz numbers), however rather than saying the numbers as they are in English, we turn every number into a sensible number. So, as we play buzz – fourteen becomes one-ty-four; thirty-six becomes three-ty-six.</p> <p>20 mins</p> | | |
|--|--|--|

| |
|--|
| <p>Observations of students' learning: Student ability to classify themselves correctly as having a crazy or sensible number. Student ability to work in pairs to determine which of the numbers on the number chart are sensible, and which are crazy.</p> |
| <p>Teacher's Resources: Whiteboard. EWB and SplatBoard. Large numbers on cardboard.</p> |

Catering for inclusion:

Extending prompts:

- Extension: Activity 3 (pairs). Give students a sheet with some random thousand numbers. Get students to work out which numbers are crazy, and to place a counter on these numbers.
- Super extension: Why might some people think that the number 14,365 could be classified as 'crazy'? (Answer: because our counting system starts again when we reach the thousands, 14 is crazy, which makes 14 thousand crazy. Note how we say 14 thousand, and that this is not 1 million 4 thousand etc; almost all top students at Grade 2 level made this very understandable error).
- With regards to extension groups: Discuss how it does not really matter with 3 (or 4 digit numbers) what the 1st (or 2nd) digit are – it is the last 2 numbers which determine whether a number is sensible or crazy.

Enabling prompt:

- Spend considerable time physically modelling the teen numbers, and discussing how we would say these numbers if English was a sensible language (e.g., one-ty-four). The assumption is that the teen numbers are the most counter-intuitive, and perhaps do the most to undermine their understanding of place value.

Your reflection: Identify the pedagogical stance you took during the lesson and reflect on:

- what went well and why
- what was difficult and why
- how engaged the students were and
- what you did to encourage this
- what else you could have done to improve the students' learning
- how responsive you were able to be to the students
- what you learnt

SURF

Mental Maths and Problem Solving Program

LESSON PLAN FORMAT

Name: James Russo

School: Belgrave South Primary

Topic: Addition (Reading), Count on (Strategy)

Learning Area: Number

Date: 28th and 29th of August

Year Level: Grade 1/2 (Group 1)

Duration: 55 minutes x 2

Learning Purpose: To (re)introduce students to the addition symbol. To (re)introduce students to the count on strategy.

Count On Strategy: Starting at the largest number, we 'count on' the smaller number. Count on is perhaps the earliest intuitive strategy, which is more sophisticated than simply counting all. Use this strategy when adding a small number (i.e., less than 5) to another larger number. If the smaller number is 5 or greater, there is likely to be a more efficient strategy.

Australian Curriculum references:

Year 1: Represent and solve simple addition and subtraction problems using a range of strategies including counting on, partitioning and rearranging parts.

Year 2: Solve simple addition and subtraction problems using a range of efficient mental and written strategies, such as commutativity for addition, building to 10, 10 facts, doubles and adding 10.

| | Group set up | Materials |
|---|--------------|-----------------------------|
| <p>Lesson 1: Addition sign and Count-On (verbal method, abacus method)</p> <p>Review Review SURF board to date (2 mins)</p> <p>Engagement</p> <ol style="list-style-type: none"> 1) (Re)Introduction to addition sign, and what it means. Think-Pair-Share what the addition sign might mean. Generate some form of anchor chart as a group (10 mins) 2) Introduction to count-on strategy. 3) Model the strategy using the abacus and introduce the verbal method – see below. (10 mins) <p>Introduce students to the Verbal Method</p> <ol style="list-style-type: none"> a) Students repeat the number sentence back to themselves b) Students state the largest number in the number sentence, tap their head ('put the largest number in your head, and count on') and hold up their fist c) Students begin counting on from this number, using their fingers to keep track of their counting | Individual | Abacus Dice Workbooks |

| | | |
|---|--|--|
| <p>d) Students stop counting once they are holding up the same number of fingers as the number they are adding</p> <p>Students write/ state the answer to the number sentence/ question</p> <p>Procedure</p> <p>1) Get students to roll 2-dice. They need to add the smaller number to the larger number using the count on method (verbally), and record the number sentence in their workbook.</p> <p>20 mins</p> <p>Bringing it together:</p> <p>Review what the addition sign means. Review the count on strategy at the end of the class. Get different students to model the use of the strategy using an abacus and/or the verbal method.</p> <p>10-15 mins</p> <p>Lesson 2: Count-On (number line method)</p> <p>Review</p> <p>Addition sign and counting on using the verbal method and the abacus (5 mins)</p> <p>Engagement</p> <p>1) Introduction to number line method.</p> <ol style="list-style-type: none"> Student write down the number sentence (e.g., $6 + 3$) (if necessary) Student circles the largest number Student create a number line, beginning at the largest number Student count on by ones along the number line until they have 'counted on' the smaller number Students write/ state the answer to the number sentence/ question <p>15 minutes</p> <p>Procedure</p> <p>2) Get students to roll 2-dice. They need to add the smaller number to the larger number using the count on method. However, rather than simply do it verbally, encourage students to use an open number line, and record this number line in their workbook.</p> <p>20 mins</p> <p>Bringing it together:</p> <p>Review what the addition sign means. Review the count on strategy at the end of the class. Get different students to model the use of the number line method.</p> <p>10-15 mins</p> | | |
|---|--|--|

Observations of students' learning: Observations during independent game activity. Whether students choose/ appear to need to access either an enabling prompt or an extending prompt. Whether students are confident and capable of demonstrating their learning in front of the class.

Teacher's Resources: Whiteboard, Large Dice.

Catering for inclusion:

Lesson 1 & 2 Enabling Prompt: If students are having difficulty counting on using the verbal method, the abacus or the number line method, consider getting a student to undertake the same activity using counters. The student can attempt to use the count on strategy as they 'add' the required amount, however if this proves too difficult, or they become confused, they can simply use the 'count all' method. Note that students can also examine how many counters they have at the end as a way of checking whether they counted back correctly.

Lesson 1 & 2 Extending Prompt: Undertake the same activity, however require students to use one 20-sided dice and one 6-sided dice. The dice can be augmented further to increase the level of challenge (e.g., using a 10's dice and a 10-sided 1's dice)

Your reflection: Identify the pedagogical stance you took during the lesson and reflect on:

- what went well and why
- what was difficult and why
- how engaged the students were and
- what you did to encourage this
- what else you could have done to improve the students' learning
- how responsive you were able to be to the students
- what you learnt



SURF

Mental Maths and Problem Solving Program

LESSON PLAN FORMAT

Name: James Russo

School: Belgrave South Primary

Topic: Subtraction (Reading), Count back (Strategy)

Learning Area: Number

Date: 4th and 5th of September

Year Level: Grade 1/2 (Group 1)

Duration: 55 minutes x 2

Learning Purpose: To (re)introduce students to the subtraction symbol. To (re)introduce students to the count back strategy.

Count Back Strategy: Starting at the largest number, we 'count back' the smaller number. Count back is another early intuitive strategy which is more efficient than subtracting by elimination and then counting all. Use this strategy when subtracting one number from another. Note that if the smaller number is greater than 4, it is likely that there will be a more efficient and reliable strategy than 'counting back' (such as its counterpart, 'counting up', which will be explored in the following weeks).

Australian Curriculum references:

Year 1: Represent and solve simple addition and subtraction problems using a range of strategies including counting on, partitioning and rearranging parts.

Year 2: Solve simple addition and subtraction problems using a range of efficient mental and written strategies, such as commutativity for addition, building to 10, 10 facts, doubles and adding 10.

| | Group set up | Materials |
|---|--------------|-----------------------------|
| <p>Lesson 1: Subtraction sign and Count-Back (verbal method, abacus method)</p> <p>Review Review SURF board to date (2 mins)</p> <p>Engagement</p> <ol style="list-style-type: none"> 1) Introduction to subtraction sign, and what it means. Think-Pair-Share what the subtraction sign might mean. Generate some form of anchor chart as a group (10 mins) 2) Introduction to count-back strategy. Describe it to students as being the same as count-on, only we count-back instead because we are subtracting the smaller number, not adding the smaller number. 3) Model the strategy using the abacus and introduce the verbal method – see below. (10 mins) <p>Introduce students to the Verbal Method</p> <ol style="list-style-type: none"> a) Students repeat the number sentence back to themselves b) Students state the largest number in the number sentence, tap their head ('put the largest number in your head, and count | Individual | Abacus Dice Workbooks |

back') and hold up their fist

- c) Students begin counting back from this number, using their fingers to keep track of their counting
- d) Students stop counting once they are holding up the same number of fingers as the number they are subtracting

Students write/ state the answer to the number sentence/ question

Procedure

- 1) Get students to roll 2-dice. They need to subtract the smaller number from the larger number using the count back method (verbally), and record the number sentence in their workbook.

20 mins

Bringing it together:

Review what the subtraction sign means. Review the count back strategy at the end of the class. Get different students to model the use of the strategy using an abacus and/or the verbal method.

10-15 mins

Lesson 2: Count-Back (number line method)

Review

Subtraction sign and counting back using the verbal method and the abacus (5 mins)

Engagement

- 1) Introduction to number line method.
 - a) Student write down the number sentence (e.g., $6 - 3$) (if necessary)
 - b) Student circles the largest number
 - c) Student create a number line, beginning at the largest number
 - d) Student hop back by ones along the number line until they have 'counted back' the smaller number
 - e) Students write/ state the answer to the number sentence/ question

15 minutes

Procedure

- 2) Get students to roll 2-dice. They need to subtract the smaller number from the larger number using the count back method. However, rather than simply do it verbally, encourage students to use an open number line, and record this number line in their workbook.

20 mins

Bringing it together:

Review what the subtraction sign means. Review the count back strategy at the end of the class. Get different students to model the use

| | | |
|--|--|--|
| of the number line method. 10-15 mins | | |
|--|--|--|

Observations of students' learning: Observations during independent game activity. Whether students choose/ appear to need to access either an enabling prompt or an extending prompt. Whether students are confident and capable of demonstrating their learning in front of the class.

Teacher's Resources: Whiteboard, Large Dice.

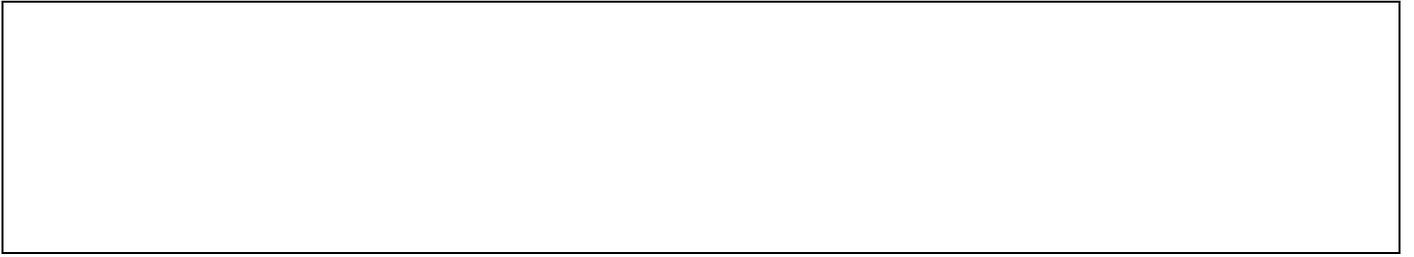
Catering for inclusion:

Lesson 1 & 2 Enabling Prompt: If students are having difficulty counting back using the verbal method, the abacus or the number line method, consider getting a student to undertake the same activity using counters. The student can attempt to use the count back strategy as they 'take away' the required amount, however if this proves too difficult, or they become confused, they can simply use the 'elimination' method. Note that students can also examine how many counters are left at the end as a way of checking whether they counted back correctly.

Lesson 1 & 2 Extending Prompt: Undertake the same activity, however require students to use one 20-sided dice and one 6-sided dice. The dice can be augmented further to increase the level of challenge (e.g., using a 10's dice and a 10-sided 1's dice)

Your reflection: Identify the pedagogical stance you took during the lesson and reflect on:

- what went well and why
- what was difficult and why
- how engaged the students were and
- what you did to encourage this
- what else you could have done to improve the students' learning
- how responsive you were able to be to the students
- what you learnt



SURF

Mental Maths and Problem Solving Program

LESSON PLAN FORMAT

Name: James Russo

School: Belgrave South Primary

Topic: Count On (Strategy), Count Up (Strategy) and Count Back (Strategy)

Learning Area: Number

Date: 18th and 19th of September

Year Level: Grade 1/2 (Group 1)

Duration: 55 minutes x 2

Learning Purpose: To reinforce to students that count up and count back are related strategies. To enhance students understanding of the number line to support the count back strategy and the count-up strategy. For students to know when count-back is a more efficient strategy and when count-up is a more efficient strategy.

There is also a brief revision of counting on in the first lesson.

Count Back Strategy: Starting at the largest number, we 'count back' the smaller number. Count back is another early intuitive strategy which is more efficient than subtracting by elimination and then counting all. Use this strategy when subtracting one number from another. Note that if the smaller number is greater than 4, it is likely that there will be a more efficient and reliable strategy than Counting Back.

Count Up Strategy: Starting at the smallest number, we 'count up' until we reach the largest number. This is a more sophisticated strategy than counting on and counting back, because it involves thinking about subtraction as the difference between two numbers. It involves an extra mental step. If the answer to the question is greater than 4, Counting Up will cease to be an efficient and effective strategy.

Australian Curriculum references:

Year 1: Represent and solve simple addition and subtraction problems using a range of strategies including counting on, partitioning and rearranging parts.

Year 2: Solve simple addition and subtraction problems using a range of efficient mental and written strategies, such as commutativity for addition, building to 10, 10 facts, doubles and adding 10.

| | Group set up | Materials |
|---|-------------------------------------|--|
| <p>Lesson 1: Count-Up (introduction)</p> <p>Review Discuss what was covered in SURF in previous weeks. Get students to demonstrate count back and count on using the verbal method/ while the teacher models responses using a number line. Discuss Count On and Count Back as being two cousins, one who is generous (count back) and one who is greedy (count on). We use count back for subtraction and count on for addition.</p> <p>5 mins</p> | Teacher groupings based on ability. | <p>Lesson 1: Abacus Dice Number Charts Counters</p> <p>Lesson 2: Abacus Dice</p> |

Engagement

- 1) Today we are going to meet a third cousin, count up. He is the youngest member of the 'count' family and he is always trying to catch up with his cousins (which is why he begins at the smallest number, and moves up to the biggest number). We use him for subtraction as well.
- 2) Demonstrate the verbal method for count up:

Verbal method:

1. Students repeat the number sentence back to themselves
2. Students state the smallest number in the number sentence and hold up their fist
3. Students begin counting up from this number, using their fingers to keep track of their counting
4. Students stop counting once they reach the larger number
5. Students write/ state the answer, which corresponds to how many fingers they are holding up

Note: Initially this strategy should be modelled parallel to working with concrete materials. Encourage students to talk through the strategy as they manipulate the materials (an abacus is likely to be particularly useful).

5 mins

- 3) Get 2 student volunteers. Students need a 100's board and a dice between the two players. Students need to sit back to back. Student A has a dice and two counters. The student needs to decide where they will put their first counter (somewhere between 1 and 20 on the board initially – see prompts below). Student A then rolls the dice, and places the other counter that many places after the first counter (using count on). They then ask Student B 'what is the difference between xx (number 1) and xx (number 2)'. Student B needs to use count up to figure out the answer. They should first try to figure out the answer using the verbal method and through visualisation (that is, without turning around). Student B can then 'check their answer' by turning around and looking at the 100's board and counting up. If the student is correct, leave those particular numbers covered by the counters. See how many numbers the team can cover together in the available time. After a few minutes, students can switch rolls. Note that this activity will have the student rolling the dice and facing the 100's board practising count on, and the other student (the visualiser) practising count up

15 mins

Procedure

- 1) Get students to play 'What's the difference' game that we modelled together. Again, it is a cooperative game. Students are working together to try and cover their 100's chart.
- 2) After a few minutes, students can switch roles.

25 mins

| | | |
|---|--|--|
| <p>Bringing it together:</p> <p>1) Get students to record how many numbers they covered on their 100's boards. Come together and we can play 'What's the difference': (the teacher can secretly roll the dice and mark the two numbers on the 100's board).</p> <p>10 mins</p> <p>Lesson 2: Count-Back vs Count-Up: Which is more efficient?</p> <p>Review</p> <p>Discuss what was covered in the previous SURF lesson. Get students to model count up using the verbal method.</p> <p>5 mins</p> <p>Engagement</p> <p>1) Show how count up can be represented on a number line. Contrast this with representing count on and count back (the other two cousins). Emphasise how counting up and counting back are both different subtraction strategies, they just involve us seeing subtraction as the difference between (counting up) or take away (counting back).</p> <p>2) Get 2 student volunteers. Roll 2 dice (1 ten-sided and 1 six-sided; or 1 20-sided and 1 six-sided). One student's job is to focus on counting back and the other student's job is to focus on counting up. Get both students to figure out the subtraction on a number line (using the same whiteboard, but with two markers). The students need to draw up a scorecard on a piece of paper. They can record the subtraction under one of 3 categories. 'Counting Up was easier'; 'Counting Back was easier'; 'They were about the same'. Have this worksheet organised before the lesson. The key insight I am looking for is the notion that sometimes count up will be a more efficient strategy (when the two numbers are close together), and sometimes count back will be a more efficient (when the number we are subtracting is small).</p> <p>15 mins</p> <p>Procedure</p> <p>1) Get students to play 'Which was easier'. Get them to switch roles halfway through.</p> <p>25 mins</p> <p>Bringing it together:</p> <p>1) Get students to share and discuss their responses.</p> <p>10 mins</p> | | |
|---|--|--|

Observations of students' learning: Observations during independent game activity. Whether students choose/ appear to need to access either an enabling prompt or an extending prompt. Whether students

are confident and capable of demonstrating their learning in front of the class.

Teacher's Resources: EWB with splatboard, Whiteboard, Large Dice

Catering for inclusion:

Lesson 1, Enabling Prompt: If students are having difficulty counting up using visualising, encourage them to physically count the numbers between the two counters. Restrict the range of the starting number from 1 to 10 (rather than allowing students to extend this number to 20).

Lesson 1, Extending Prompt: Allow Student A to choose higher number (e.g., numbers greater than 20)

Lesson 2, Enabling Prompt: If students find it difficult to classify which method was easier, simply get them to practice counting back and counting up. If using one method each is seen as too confusing, get both students to practice count up, as this is the main teaching point for these two lessons.

Lesson 2 Extending Prompt: Use two 20-sided dice.

Your reflection: Identify the pedagogical stance you took during the lesson and reflect on:

- what went well and why
- what was difficult and why
- how engaged the students were and
- what you did to encourage this
- what else you could have done to improve the students' learning
- how responsive you were able to be to the students
- what you learnt

