

Add and Subtract Single-digit Numbers Bridging Any Decade ↖

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Let's Implement Seamless

ASSESSMENT

DIFFERENTIATION

INVESTIGATION

PROBLEM SOLVING

INTERVENTION

INTEGRATION in Mathematics

SEAMLESS ASSESSMENT, DIFFERENTIATION, INVESTIGATION, PROBLEM SOLVING, INTERVENTION, INTEGRATION

Not every student will be ready to investigate or solve problems at this Level and so we will need to assess and differentiate to ensure every student is learning at their leading edge.

Some students may not yet be ready to investigate this concept at any Level, and so we will need to provide some intervention.

Every mathematical concept is integrally related to other mathematical concepts. Teaching and learning related concepts simultaneously develops deep relational understanding.

ADD AND SUBTRACT SINGLE-DIGIT NUMBERS BRIDGING ANY DECADE.

EXPLICIT TEACHING PLAN OVERVIEW PAGE

THIS PAGE IS A SUMMARY OF THE EXPLICIT TEACHING PLAN, INCLUDING STRATEGIC QUESTIONS, AND DESCRIBING THE SEQUENCE WHICH WILL OCCUR OVER MULTIPLE LESSONS.

RESOURCES: PLAYING CARDS TO CREATE NUMBERS TO INVESTIGATE, PENCIL AND PAPER FOR RECORDING, 1 FULL 10 FRAME AND 1 EMPTY 10 FRAME AND COUNTERS FOR PLACE VALUE 9 INTEGRATION, SMALL 10 FRAMES FOR PLACE VALUE 10 INTEGRATION, 1 cm² CONNECTING CUBES FOR PLACE VALUE 11 INTEGRATION

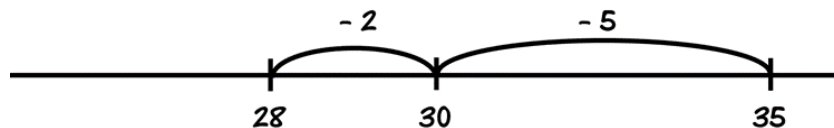
WHAT COULD WE DO?

Children:

- add single-digit number to a two-digit number to make a number in the next decade, using friends of any decade to bridge to the next decade, partitioning, then using place value to add the remaining part, recording on a number line, for example,



- subtract a single-digit number from a two-digit number to make a number in the decade below, using place value to bridge to the decade below, partitioning, then using friends of any decade to subtract the remaining part, recording on a number line, for example,



WHAT LANGUAGE COULD WE USE TO EXPLAIN AND ASK QUESTIONS?

Children:

- ask one another questions about adding single-digit numbers to two-digit numbers using place value to bridge any decade, for example:
 - ▶ How could we use friends of any decade to add to any decade?
 - ▶ How did we partition the number we are adding?
 - ▶ How could we add the remaining part using place value?
- ask one another questions about subtracting single-digit numbers from two-digit numbers using place value to bridge any decade, for example:
 - ▶ How could we use place value to subtract to the decade below?
 - ▶ How did we partition the number we are subtracting?
 - ▶ How could we subtract the remaining part using friends of any decade?

ADD AND SUBTRACT SINGLE-DIGIT NUMBERS BRIDGING ANY DECADE.

EXPLICIT TEACHING PLAN

FULL EXPLICIT TEACHING PLAN, EMBEDDING DEEP RELATIONAL UNDERSTANDING, METALANGUAGE, AND QUESTIONS THAT MAY BE USED OVER MULTIPLE LESSONS.

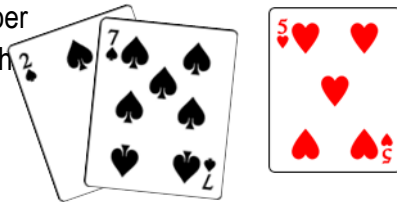
WHAT COULD WE DO?

Children think about, talk and listen to a friend about, then have the opportunity to share what they already know.

Allowing children to use cards to generate numbers that they are ready to investigate:

- provides student-led differentiation
- develops number sense
- develops capacity to reason as children have to select numbers that add into the next decade rather than the teacher providing them

Select 3 cards to make a two-digit number and a single-digit number that add into the next decade, for example,



Record, for example, $27 + 5 =$

Record an open empty number line, for example,

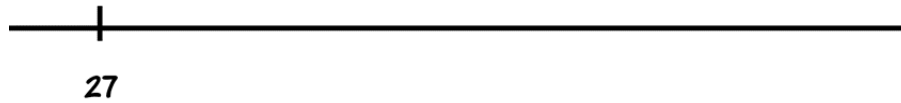
WHAT LANGUAGE COULD WE USE TO EXPLAIN AND ASK QUESTIONS?

- ▶ Today brings an investigation about addition.
- ▶ What do you know about addition?
- ▶ Talk about addition with a friend.
- ▶ Is anyone ready to share what they are thinking about addition?

- ▶ We've investigated using place value to add single-digit numbers that add to more than 10 and 20.
- ▶ **Today we're going to select cards to make a two-digit number and a single-digit number to add together.**
- ▶ What numbers did we select?
- ▶ Did we make 27 and 5?

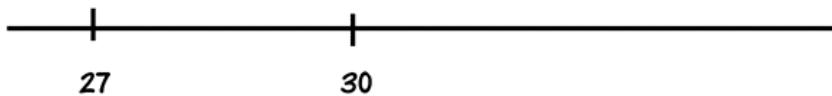
- ▶ Let's record our number sentence
- ▶ Let's record an open empty number line.
- ▶ If we add 27 and 5, will we get a bigger number? Will we get a higher number?
- ▶ In which direction do the numbers get bigger - moving right or moving left?
- ▶ Do numbers get larger as we move to the right on the number line?
- ▶ So if we get a higher number, will we start at the left end of the number line so we can move to the right as we get higher?

Record 27 on the mark at the left hand end of the number line, for example,

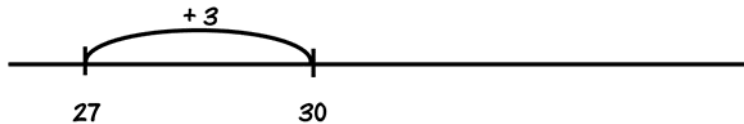


Visualising the size of numbers further develops number sense. Children could use their understanding of place value to identify that 27 and 5 will add to more than 30 because 30 is 27 and 3, and 5 is higher than 3.

Record 30 on a mark on the number line, for example,



Record a jump from 27, record + 3 above the jump, for example,



Point to the 5 in the number sentence, for example, $27 + 5 =$

Partition 5 into 3 and ..., for example,

$$\begin{array}{r} 27 + 5 = \\ \quad \swarrow \searrow \\ \quad 3 + \end{array}$$

- ▶ Let's record a mark on the left end of the number line, and record 27 under the mark.
- ▶ We're adding 27 and 5.
- ▶ Close your eyes and visualise 27.
- ▶ Now visualise 5.
- ▶ If we add 5 to 27, will we have more than 30? Don't count - just visualise.
- ▶ Because we're adding using place value, we want to jump to the next place value.
- ▶ We're adding ones, so we want to jump to the next tens number.
- ▶ What is the next tens number?
- ▶ Is the next tens number 30?
- ▶ Let's record 30 on our number line.
- ▶ How many will we add to 27 to make 30?

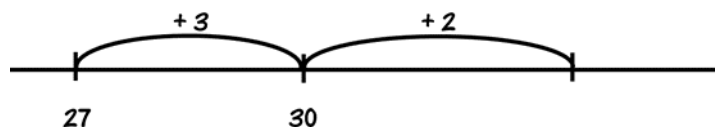
- ▶ If we add 3, will we have 30?

- ▶ Did we add all of our 5?
- ▶ Or did we add part of our 5?
- ▶ What part did we add?
- ▶ Did we add 3?
- ▶ Did we partition 5?
- ▶ Is one of our parts, 3?
- ▶ How many in the other part?

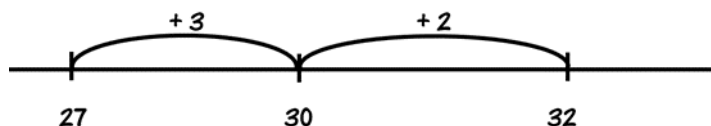
Record the 3 and 2 partition of 5, for example,

$$\begin{array}{r} 27 + 5 = \\ \quad \swarrow \searrow \\ \quad 3 + 2 \end{array}$$

Record a jump from the 20 and record + 2 above it, for example,



Record 22 where the jump lands, for example,



Point to the + 3 and the + 2 above the jumps, for example,



Record, for example, $27 + 5 = 32$

- ▶ Are there 2 in the other part?
- ▶ Did we partition 5 into 3 and 2?
- ▶ We've already added the 3.
- ▶ How many more do we have to add?
- ▶ Do we have to add 2 more?
- ▶ How can we use place value to add 2 to 30?
- ▶ We have 30 and we need to add 2.
- ▶ What do you know about 30 and 2?
- ▶ Is 30 and 2, 32?
- ▶ If we add 2 to 30, will we have 32?

- ▶ How many did we add altogether?
- ▶ Did we add 3 and then 2?
- ▶ Did we add 5 altogether?
- ▶ Does 27 plus 5 equal 32?
- ▶ Do you think 27 plus 5 would equal the same amount as 5 plus 27?

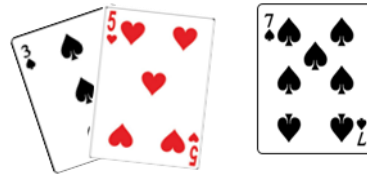
Children think about, talk and listen to a friend about, then have the opportunity to share what they already know.

Allowing children to use cards to generate numbers that they are ready to investigate:

- provides student-led differentiation
- develops number sense
- develops capacity to reason as children have to select numbers that subtract into the decade below rather than the teacher providing them

Select a cards to make a single-digit number to subtract from a two-digit number to make a number in the decade below.

Place the 2 and the 5 overlapping to make a two-digit number, and the 7 beside them to make a number sentence (equation) and not under one another like an algorithm.

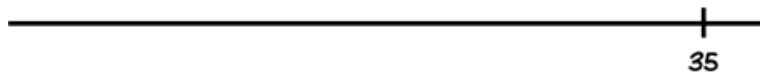


Visualising the size of numbers further develops number sense. Children could use their understanding of place value to identify that 35 and 7 will subtract to less than 30 because 35 is 30 and 5, and 7 is higher than 5.

Record, for example, $35 - 7 =$

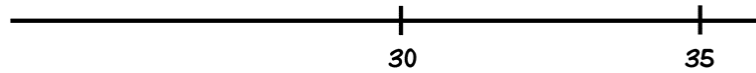
Record and open empty number line. for example,

Record 35 at the right end of the number line, for example,

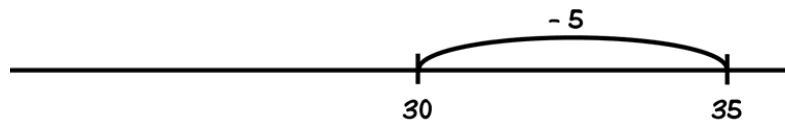


- ▶ Today brings an investigation about subtraction.
- ▶ What do you know about subtraction?
- ▶ Talk about subtraction with a friend.
- ▶ Is anyone ready to share what they are thinking about subtraction?
- ▶ **Today we're going to investigate how we could use place value, partitioning and friends of 20 to subtract.**
- ▶ We want our numbers to subtract into the decade below so we can use these place value concepts.
- ▶ Let's look at the numbers we selected - 35 and 7.
- ▶ Close your eyes and think about 35. Think about how big 35 is.
- ▶ Now visualise 7. Think about how big 7 is.
- ▶ If we subtract 7 from 35, will we have less than 30? How do you know?
- ▶ Because 7 and 35 will subtract to less than 30, we can use place value, partitioning and friends of 30 to subtract without having to count by 1s.
- ▶ Let's record an open empty number line.
- ▶ If we have 35, and we subtract 7, will we get bigger or smaller?
- ▶ Will we get smaller?
- ▶ If numbers get smaller as we move towards the left, will 25 go on the right end of the number line so that we can jump towards the left as we get smaller?
- ▶ Because we're subtracting using place value, we want to jump to the next place value.
- ▶ We're subtracting ones, so we want to jump back to the tens number.
- ▶ What is the tens number we'll jump back to?

Record 30 on a mark on the number line, for example,



Record a jump from 35, record - 5 above it, for example,



Partition 5 into 2 and ..., for example,

$$\begin{array}{r} 35 - 7 = \\ \swarrow \searrow \\ 5 + \end{array}$$

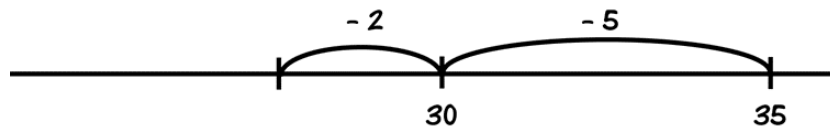
Record the 2 and 3 partition of 5, for example,

$$\begin{array}{r} 35 - 7 = \\ \swarrow \searrow \\ 5 + 2 \end{array}$$

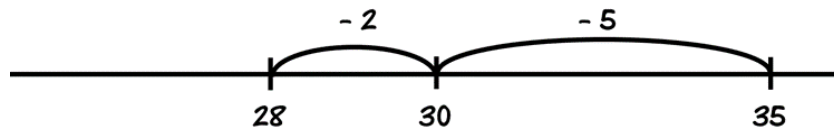
- ▶ Is the tens number we'll jump back to 30?
- ▶ How can we use place value to work out how many we subtracted from 35 to make 30?
- ▶ What does 35 mean using place value?
- ▶ Is 35, 30 and 5?
- ▶ How many would we need to subtract to get back to 30?
- ▶ If we subtract the 5, will we have the 30 left?

- ▶ Did we subtract all of our 7?
- ▶ Or did we subtract part of our 7?
- ▶ What part did we subtract?
- ▶ Did we subtract 5?
- ▶ Did we partition 7?
- ▶ Is one of our parts, 5?
- ▶ How many in the other part?
- ▶ Are there 2 in the other part?
- ▶ Did we partition 7 into 5 and 2?

Record a jump from the 30 and record - 2 above it, for example,



Record 28 where the jump ends, for example,



Record, for example, $12 - 5 = 7$

- ▶ We've already subtracted the 5.
- ▶ How many more do we have to subtract?
- ▶ Do we have to subtract 2 more?

- ▶ How could we use friends of any decade to subtract the 2?
- ▶ If we subtract 2 from 30, will we have 28 left?

- ▶ How many did we subtract altogether?
- ▶ Did we subtract 5 and then 2?
- ▶ Did we subtract 7 altogether?
- ▶ What does 35 minus 7 equal?
- ▶ Does 35 minus 7 equal 28?

Children alternate between addition and subtraction to ensure they develop deep understanding of both, and their reciprocal natures.