

Friends of 10 – Addition, Commutativity, Subtraction

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Differentiate and Assess

Not every student will be ready to investigate this concept at this Level and so we will need to differentiate to ensure every student is learning at their leading edge. Select the Differentiate button on this screen.

Integrate

Every mathematical concept is integrally related to other mathematical concepts. Teaching and learning related concepts simultaneously develops deep relational understanding. Select the Integrate button on this screen.

Intervene

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

FRIENDS OF 10 – ADDITION, SUBTRACTION, COMMUTATIVITY.

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, 10 FRAMES, COUNTERS, PENCIL, PAPER

WHAT COULD WE DO?

Children:

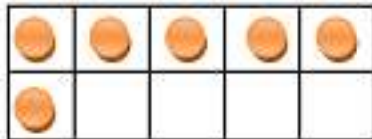
- explain friends of 10 through addition, for example,

$$6 + 4 = 10$$



- explain friends of 10 through commutativity, for example,

$$6 + 4 = 10$$



$$4 + 6 = 10$$

- explain friends of 10 through subtraction, for example,

$$10 - 4 = 6$$



WHAT LANGUAGE COULD WE USE TO EXPLAIN AND ASK QUESTIONS?

Children:

- ask one another questions about friends of 10 through addition, subtraction and commutativity, for example,
 - how could we use a 10 frame to find friends of 10 using addition?
 - what is ... friend of 10?
 - how could we record this as an addition number sentence?
 - how can friends of 10 swap places?
- how could we use a 10 frame to find friends of 10 using subtraction?
- how could we record this as a subtraction number sentence?

FRIENDS OF 10 – ADDITION, SUBTRACTION, COMMUTATIVITY.

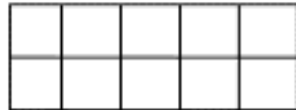
EXPLICIT TEACHING PLAN

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.

Have containers of 20 counters available (grouping 20 counters in small containers is very convenient).



Display an empty [10 frame](#). for example,

Children identify the number of spaces, counting them if necessary.

Children identify the number of spaces in the top row, counting them if necessary.

Children identify the number of spaces in the bottom row, counting them if necessary.

WHAT LANGUAGE COULD WE USE TO EXPLAIN AND ASK QUESTIONS?

- ▶ Today brings an investigation about Friends of 10.
- ▶ What do you know about Friends of 10?
- ▶ Talk about Friends of 10 with a friend.
- ▶ Is anyone ready to share what they are thinking about Friends of 10?

▶ **Let's investigate Friends of 10.**

- ▶ How many spaces on this 10 frame?
- ▶ Are there 10 spaces on the 10 frame?
- ▶ Why do you think it is called a 10 frame?
- ▶ Do you think it is called a 10 frame because it has 10 spaces?
- ▶ How many spaces on the top row?
- ▶ Are there 5 spaces in the top row?
- ▶ How many spaces on the bottom row?
- ▶ Are there 5 spaces in the bottom row?

Select a playing card, for example, 6



Place 6 counters into the 10 frame, filling from the top left, for example,



Children ask their friend the question, then explain there are 5 counters in the top row and how they know, for example, they counted, they know there are 5 spaces and each space as a counter, when the top row is full there are 5 counters, they subitised 5, etc.

Children ask their friend the question, then explain there is 1 counter in the bottom row and how they know, for example, they counted, they know there are 5 spaces and there are 4 empty spaces, they subitised 1, etc.

Children ask their friend the question, then explain there are 6 counters altogether and how they know, for example, they counted, they know there are 5 in the top row and 1 in the bottom row and 5 and 1 is 6, there are 10 spaces in a 10 frame and there are 4 empty spaces, they subitised 5 and 1, etc.

- ▶ Let's place some counters into the 10 frame.
- ▶ What number did we select?
- ▶ Did we select number 6?
- ▶ Let's place 6 counters on the 10 frame.
- ▶ Will we start filling the 10 frame from the top left, then the bottom left?

▶ Let's ask 4 very important questions!

▶ **How many in the top row?**

- ▶ Are there 5 counters in the top row?
- ▶ How do you know?
- ▶ Do you know because you counted?
- ▶ Do you know because the top row is full?
- ▶ Do you know because you subitised 5?

▶ **How many in the bottom row?**

- ▶ Is there 1 counter in the bottom row?
- ▶ How do you know?
- ▶ Do you know because you counted?
- ▶ Do you know because you subitised 1?

▶ **How many altogether?**

- ▶ Are there 6 altogether?
- ▶ How do you know?
- ▶ Do you know because you counted?

Children ask their friend the question, then explain they need 4 more to make 10 and how they know, for example, they counted the spaces, there are 10 spaces in a 10 frame and 6 spaces have counters so there are 4 empty spaces, they subitised the 4 spaces, etc.

Children record the 10 frame with 6 counters, for example,

Allowing children to draw their 10 frame develops spatial reasoning and will allow them to visualise counters on a 10 frame to learn their friends of 10.

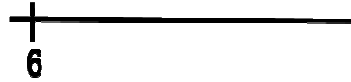


Record, for example, $6 + 4 = 10$

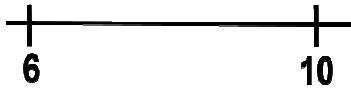
- ▶ Do you know because you subitised 5 and 1, and put them together to make 6?
- ▶ Do you know because 5 and 1 is 6?
- ▶ **How many more to make 10?**
- ▶ Do we need 4 more to make 10?
- ▶ How do you know?
- ▶ Do you know because when the 10 frame is full, there are 10 counters and we'd need to fill the 4 empty spaces?
- ▶ Do you know because you counted the 4 empty spaces?
- ▶ Do you know because you subitised the 4 empty spaces?

- ▶ How could we record this?
- ▶ Could we record a 10 frame?
- ▶ Could we record the 6 counters?
- ▶ Could we record a number sentence?
- ▶ How many counters are in the 10 frame?
- ▶ How many do we need to add to make 10?
- ▶ Could we record that 6 and 4 equals 10?
- ▶ Because 6 and 4 equals 10, we say that 6 and 4 are friends of 10.
- ▶ What is 6's friend of 10?
- ▶ Is 6's friend of 10, 4?

Record an open empty number line, with 6 near the left end, for example,



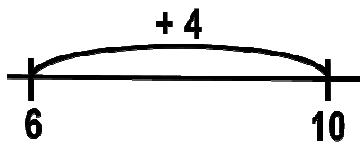
Record 10 on the number line, for example,



Record a jump from 6 to 10, for example,

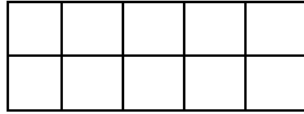


Record, + 4 above the jump, for example,



- ▶ We've investigated counting by 1s to add and subtract on a number line.
- ▶ **Do you think we could show our friends of 10 on a number line?**
Let's investigate!
- ▶ Let's place 6 on our number line.
- ▶ Now let's place 10 on our number line.
- ▶ Let's record 1 jump all the way from 6 to 10.
- ▶ How many are we adding to 6 to make 10?
- ▶ What is 6's friend of 10?
- ▶ Is 6's friend of 10, 4?
- ▶ If we add 4, will we have 10?
- ▶ Have we added to make 10 on a number line, using our friends of 10?

Display another empty 10 frame, for example,



Place 4 counters into the 10 frame, filling from the top left, for example,



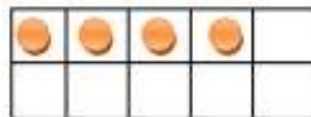
Children explain how they know there are 4 counters in the top row.

Children explain how they know there are zero counters in the bottom row.

Children explain how they know there are 4 counters altogether.

Children explain how they know there need 6 more to make 10.

Children record the 10 frame with 4 counters filled from the top left, for example,



Record $4 + 6 = 10$

▶ **If we know that 6's friend of 10 is 4, what number do you think is 4's friend of 10?** Let's investigate!

▶ Let's place 4 counters on the 10 frame.

▶ **How many in the top row?**

▶ Are there 4 counters in the top row?

▶ How do you know?

▶ **How many in the bottom row?**

▶ Are there zero counters in the bottom row?

▶ How do you know?

▶ **How many altogether?**

▶ Are there 4 altogether?

▶ How do you know?

▶ **How many more to make 10?**

▶ Do we need 6 more to make 10?

▶ How do you know?

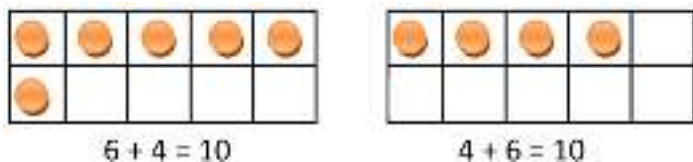
▶ How could we record this?

▶ Could we record a 10 frame?

▶ Could we record the 4 counters?

▶ Could we record our friends of 10 in a number sentence?

Display both 10 frames and both number sentences, for example,



Point to each number sentence as you read them.

Record, for example,

6 and 4 are friends of 10

4 and 6 are friends of 10

Once students have begun to demonstrate their understanding that friends of 10 are 2 numbers that add to make 10, they may make friends of 10 using their fingers – as long as they raise their fingers all at the same time. For example, raising 7 fingers at the same time, and subitising that there are 3 fingers down, so 3 more are needed to make 10.

- ▶ Because 4 and 6 equals 10, we say that 4 and 6 are friends of 10.
- ▶ What is 4's friend of 10?
- ▶ Is 4's friend of 10, 6?
- ▶ We have found that 4 and 6 are friends of 10, and we found that 6 and 4 are friends of 10.

- ▶ Let's look at the two number sentences.

- ▶ This number sentence says 4 and 6 equals 10, and this number sentence says 6 and 4 equals 10.
- ▶ Have the numbers swapped places?
- ▶ Can you swap places?
- ▶ Did you wake up at home this morning, and then come to school?
- ▶ Did you swap places?
- ▶ At lunch time, will you swap places again? Will you go outside?
- ▶ When you swap places we say that you commute.
- ▶ Commute just means to swap places.
- ▶ So just like you, did the numbers commute when we found friends of 10?
- ▶ Are 6 and 4 friends of 10?
- ▶ Are 4 and 6 friends of 10?
- ▶ Did the numbers swapped places?
- ▶ Did the numbers commute?
- ▶ So if we know that 4 and 6 are friends of 10, do we also know that 6 and 4 are friends of 10?

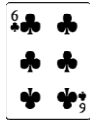
Children think about, talk and listen to a friend about, then have the opportunity to share what they already know.

Display an empty 10 frame with 10 counters in it, for example,



Children explain how they know there are 10 counters on the 10 frame.

Select a numeral card or playing card, for example, 6



Children remove 6 counters from the 10 frame, removing from the bottom right, then the top right, for example,



Children explain how they know there are 4 counters left on the 10 frame.

▶ **Let's investigate Friends of 10 using subtraction.**

- ▶ What do you know about Friends of 10?
- ▶ Talk about Friends of 10 with a friend.
- ▶ Is anyone ready to share what they are thinking about Friends of 10?

- ▶ How many counters are on this 10 frame?
- ▶ Are there 10 counters on the 10 frame?
- ▶ How do you know?

- ▶ Do you know because you counted? Do you know because you know that a 10 frame has 10 spaces? Do you know because when the 10 frame is full, there are 10 counters?
- ▶ **How many counters on the top row?**
- ▶ **How many counters on the bottom row?**

- ▶ What number did we select?
- ▶ Did we select number 6?

- ▶ Let's subtract 6 counters from the 10 frame.

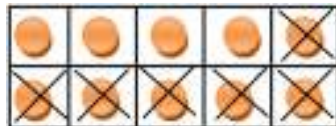
- ▶ How many counters are left on the 10 frame?
- ▶ Are there 4 counters left on the 10 frame?
- ▶ How do you know?
- ▶ Do you know because you counted?
- ▶ Do you know because you subtracted the 4 counters?
- ▶ Do you know because you know that the top row has 5 spaces, and there is still 1 empty space, so there must be 4 counters?

Record the full 10 frame, for example,

Allowing children to draw their 10 frame develops spatial reasoning and will allow them to visualise counters on a 10 frame to learn their friends of 10.



Cross out the 6 counters that we subtracted, for example,



Record, for example, $10 - 6 = 4$

Once students have begun to demonstrate their understanding that friends of 10 through subtraction means that if we have 10 and subtract a single-digit number, the number's friend of 10 is left, they may make friends of 10 through subtraction using their fingers - as long as they raise their fingers all at the same time. For example, raising 10 fingers at the same time, lowering 7 fingers at the same time, and subitising that there are 3 fingers still raised, so if they have 10 and subtract 7, they have 7's friend of 10 (3) left.

- ▶ How could we record this?
- ▶ Could we record the full 10 frame?

- ▶ Could we cross out the 6 counters that we subtracted from the 10 frame?

- ▶ Could we record a number sentence to describe what we did?
- ▶ Did we start with 10 counters in the 10 frame?
- ▶ Did we subtract 6 counters?
- ▶ Did we have 4 counters left?

- ▶ Are 6 and 4 friends of 10?
- ▶ If we start with 10, and subtract 6, will we have 6's friend of 10 left?
- ▶ Will we have 4 left?

Empty 10 frame (print, cut out and distribute two 10 frames to each child)

