Strike It Out

This resource has been inspired by the materials on NRICH. Ideas and instructions for Strike it Out can be found on their website: https://nrich.maths.org/6589. The content here has been adapted to encourage teachers to think about expanding the use of this game.

Some of the images were created using the digital manipulatives tools on the

- *Math Learning Centre free apps: https://apps.mathlearningcenter.org/number-frames/ and*
- *Mathsbot.com https://mathsbot.com/*

Overview of the Game

The game provides an opportunity to develop fluency with a range of basic facts and also provides an opportunity for pupils to develop strategic thinking.

Resources Required:

Abstract version: Paper and pencil
Materials version: Tens frames and double sided counters (Paper and pencil)

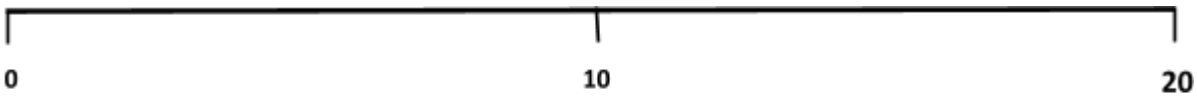
Setting up your number line:

When pupils try to draw number lines, they can sometimes end up with an irregularly spaced number line e.g.

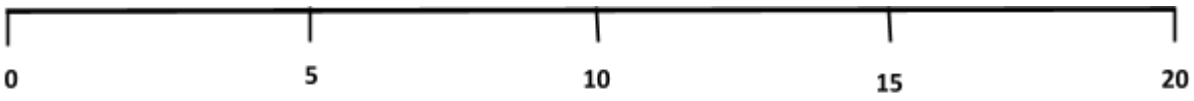
In order to help them with the regularity while also developing spatial awareness skills, you can encourage them to find set it up using knowledge of fractions e.g.

1. Draw a line and mark the end points e.g. 0 - 20:

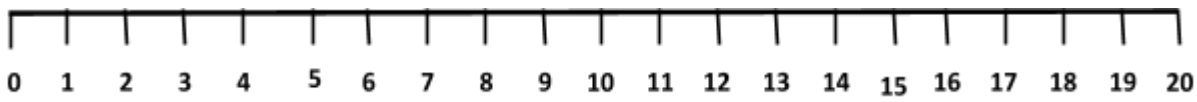
2. Ask pupils to find the half-way point (approximately), mark it and work out what is halfway between 0 and 20.



3. Ask pupils to find the half-way point between 0 and 10 AND 10 and 20 and decide what numbers go there. (Encourage discussion/reasoning about incorrect responses.)



4. Ask pupils how many lines they think will go between 0 and 5. *There is often a mix of responses between 4 and 5. Allow trial and error encouraging pupils to make sense of this for themselves.* Put in the additional lines and number them.



Strike it Out to 10 (with concrete materials)

Competitive aim: Stop you partner from going
Collaborative aim: Together, cross off as many numbers as possible

Why use concrete materials?

Through the use of materials you can encourage pupils to move from counting on and counting back to developing part-whole thinking e.g. rather than solving 4 + 3 as 4... 5, 6, 7 by using the counters and tens frame you can encourage them to see different relationships e.g. doubles and near doubles.

They also encourage development of number sense rather than rote memorisation of the facts.

Resources:

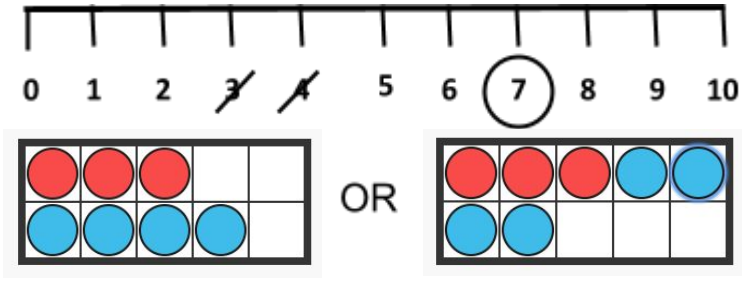
- 1 x tens frame
- Collection of counters (two colours)
- Paper and pencil
- Structured number line to 10 (can be drawn by pupils)

Basic Facts Developed:

- **Add/Sub facts within ten including**
  - Doubles/halves and near doubles/halves to 10
  - Facts to five (addition and subtraction)
  - 'Five and...' facts (addition and subtraction)
  - Facts to ten (addition and subtraction)

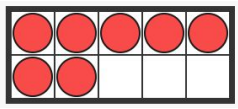
Example of how to play:

Set up the number line.



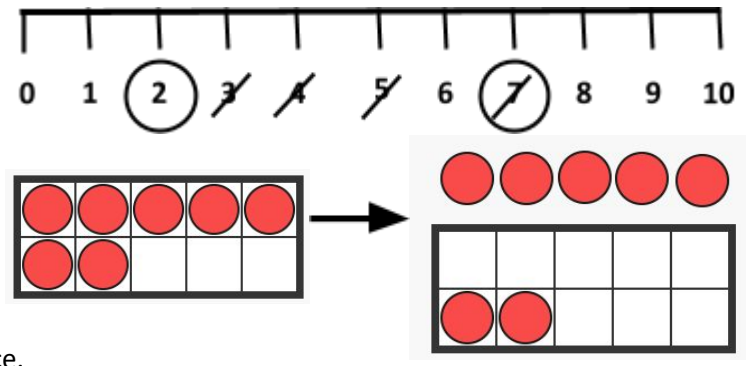
Player 1:

- Chooses two numbers and crosses them out.
- Finds the sum or difference using their tens frame (one colour counter for each number), describes how they solved the problem (e.g. I did double 3 and then one more OR Iknew 3 and 2 was 5 so then it's just 2 more which is 7).
- Writes down their calculation e.g. 3 + 4 = 7 circling the sum or difference.
- Return all the counters to one colour for the next player's turn.



Player 2:

- Crosses out the circled number from player 1's turn.
- Chooses another number and crosses that out.
- Finds the sum or difference of the two numbers describing how they solved it (e.g. I know that 5 + 2 = 7 so 7 - 5 = 2).
- Writes down their calculation e.g. 7 - 5 = 2 and circles the sum or difference.



Play continues in this way using the circled sum or difference from the previous problem until the next player can no longer take a turn.

Strike it Out to 10 (abstract - with number line only)

Game is played the same way as with the tens frame but with the number line only.

When to screen and then remove the concrete materials?

Screening first: As an intermediary step, before removing the materials completely, you could have the materials present but place a screen over the top. The pupils have to complete the calculation and describe their strategy with the materials screened. Then prove and check their strategy, demonstrating it on the materials.

No materials (number line only): If players are becoming more fluent with the 'basic facts' being worked on, it may be time to remove the materials as they develop the ability to 'just know' the answers without needing to work them out.

Players working at different levels could play the game together with one player relying more on the materials and one not. The player that doesn't need them can complete their calculation but then show a strategy to their partner to help develop their partners range of strategies.

Questions to promote strategic thinking and reasoning:

- *What strategy are you using to stop your partner from being able to take their turn/win the game?*
- *What strategy are you using to collaboratively use as many numbers as possible?*

(Pupils could compare games side by side and see if this helps them come up with a strategy)

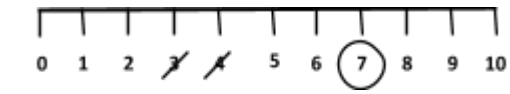
- *Can you use zero? Why/why not?*
- *Are any of your calculations doubles or halves? Why/why not?*
- *Are there some calculations that are harder to work out than others? Why is this? What would help you to understand/remember these more easily?*

Example of how to play:

Set up the number line.

Player 1:

- Chooses two numbers and crosses them out.
- Finds the sum or difference of the two numbers. Describes if they used a strategy (e.g. I did double 3 and then one more OR Iknew 3 and 2 was 5 so then it's just 2 more which is 7) or whether they 'just knew' the sum or difference.
- Writes down their calculation e.g. 3 + 4 = 7 circling the sum or difference.

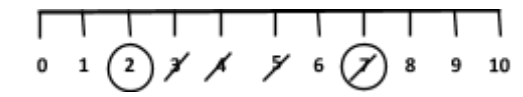


3 + 4 = 7

Player 2:

- Crosses out the circled number from player 1's turn.
- Chooses another number and crosses that out.
- Finds the sum or difference of the two numbers describing their strategy (e.g. I know that 5 + 2 = 7 so 7 - 5 = 2) or whether they 'just knew' it.
- Writes down their calculation e.g. 7 - 5 = 2 and circles the sum or difference.

And so on...



3 + 4 = 7 7 - 5 = 2

Strike It Out - Other Variations

Strike it Out to 20 with materials

Resources:

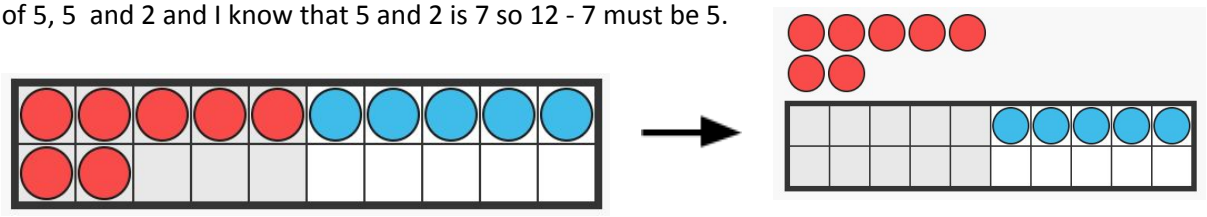
- 1 x double tens frame (vertical or horizontal)
- Collection of counters (two colours)
- Paper and pencil
- Structured number line to 20 (can be drawn by pupils)

Basic Facts Developed:

- **Add/Sub facts within ten including**
  - Doubles/halves and near doubles/halves to 10
  - Facts to five (addition and subtraction)
  - 'Five and…' facts (addition and subtraction)
  - Facts to ten (addition and subtraction)
- **Add/Sub facts within twenty including**
  - Doubles/halves and near doubles/halves to 20
  - 'Ten and…' facts (addition and subtraction)
  - 'Five and…' facts within 14 (addition and subtraction)
  - Facts to twenty (addition and subtraction)

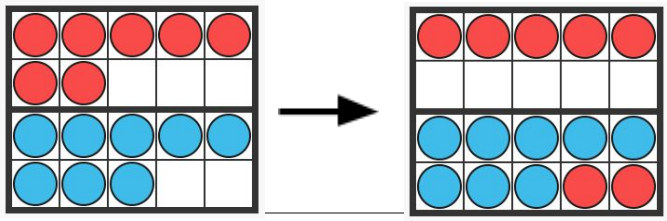
Using concrete materials:
Materials can be used in the same way but this time with either a double tens frame (horizontal or vertical). Each representation helps pupils to visualise different strategies more easily.

Horizontal representation:
E.g. If a pupil had the problem 12 - 7 they may use their 'five and…' addition and subtraction facts within 14. They may describe this as… I know 12 is made up of 5, 5 and 2 and I know that 5 and 2 is 7 so 12 - 7 must be 5.



Equally, they could have potentially made links with halves and near halves or used a bridging through a multiple of ten strategy.

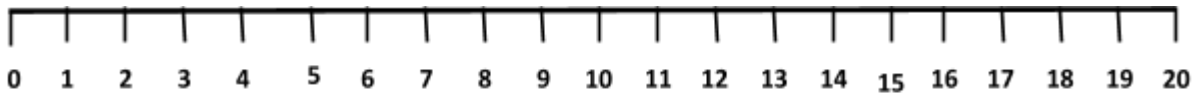
Vertical representation:
E.g. If a pupil had the problem 7 + 8 they may use their knowledge of facts to 10 and 'five and…' facts to solve this problem by bridging through 10 or a take and give strategy. They may describe this as… I know that 8 and 2 is 10 so if I take the 2 from the 7 and give it to the 10 then leave 10 and 5 which is 15.



Strike it Out to 20 (abstract - number line only)

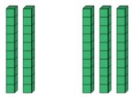
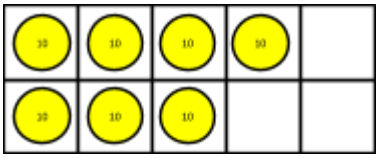
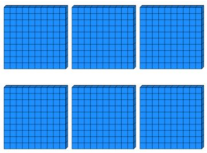
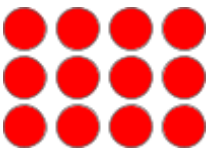
Before moving on to the number line only, pupils could play the ***screened materials*** version first as described in the Strike it Out to 10 (abstract - with number line only) version.

Then they could move on to playing with a 0 - 20 number line. The game would be played in the same way as above.



Strike it Out (other variations)

Think about how you might play this with each of the following. Suggestions for materials have been included:

Variation	Materials	
Multiples of 10 (from 0 - 100)	Dienes Equipment	
	Place value counters with tens frames	
Multiples of 100 (from 0 - 1000)	Dienes Equipment	
	Place value counters with tens frames	
Using any operation	Counters/Numicon pegs (can be organised into arrays to more easily see the relationship between multiplication and division as well as being able to use them for add/sub.	

What relationships does each game help to develop?
Can pupils see the relationships between basic facts they already know and how these could be applied (e.g. knowing 5 + 2 helps me to know 5 tens + 2 tens or 50 + 20... model this using e.g. dienes equipment).
Can you think of any other ways to play this?

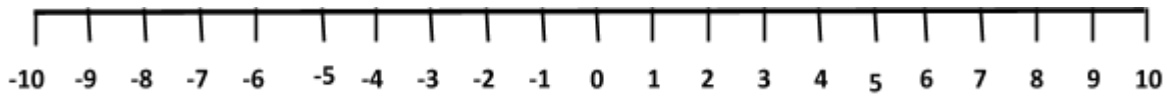
Strike it Out Integers (with concrete materials)

Resources:

- Double sided counters OR algebra tiles
- Paper and pencil
- Structured number line -10 to 10 (can be drawn by pupils)

Basic Facts and Understanding Developed:

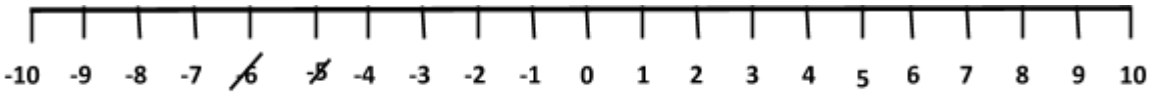
- Making sense of adding and subtracting integers (including why subtracting two negatives gives a more positive result).
- **Application of previously learnt basic facts to working with integers.**



Player 1:

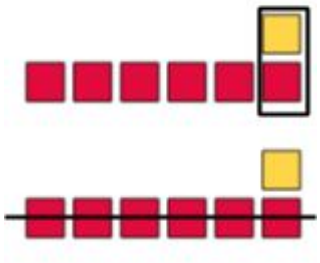
- Chooses two numbers and crosses them out.
- Finds the sum or difference of the two numbers. Describes how they worked out the answer, modelling this on their double sided counters or algebra tiles.

 = positive one  = negative one

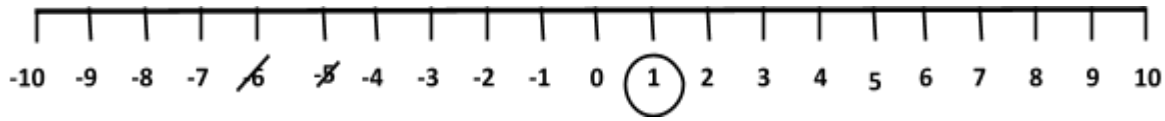


(-5) - (-6) might be solved by:

- Creating  -5
- Realising you can't subtract negative 6 so adding a 'zero pair'. ***The total value is still -5 as the +1 and -1 cancel one another out and therefore equal zero (hence 'zero pair').***
- Now subtracting the negative six leaving you with positive one.



- Writes down their calculation e.g. (-5) - (-6) = 1 circling the sum or difference.



Play continues with player 2 taking their turn as in the other games.