Activity: First to 20… and then some

First to 20 {1, 2}

This is a game for two players.

Start at 0.

- Players take it in turns to add either 1 or 2.
- The player who reaches 20 first is the winner.
- You must land exactly on 20.

While you are playing:

- Can you see a pattern?
- Is there a strategy for winning? (You may need to play the game more than once.).

What questions could be asked about this game? (What do you notice? What do you wonder?)

The winning strategy:
If the player plays perfectly, they don't make a mistake, they are guaranteed to win if they hit these numbers.

So that's the First to 20 game.

But what if we change the game?

What are some ways we could change it?

Try changing the **end number**,
e.g. what about **First to 19 {1, 2}**

Can you work out your strategy?
Try it on your friend.

Let's change it to **First to 18 {1, 2}.**

Can you calculate the winning numbers?

Who wins this game?

If a target number is declared, and you have five seconds to decide, is there a way to efficiently work out whether you'll win or lose?

First to N {1, 2}

This is a game for two players.

Start at 0.

- Players take it in turns to add either 1 or 2.
- The player who reaches N first is the winner.
- You must land exactly on N.

For example, what if it was
First to 100 {1, 2}?

Will you win?
What will your first number be.
What will your strategy be?

Can you create a rule for winning
First to N {1, 2}?

What else can we change?

First to N {a, b, …}

This is a game for two players.

Start at S.

- Players take it in turns to add either a or b or....
- The player who reaches N first is the winner.
- You must land exactly on N.

What if we changed **what we could add**?

e.g. Add either 1 or 3…

We could investigate the game where we can choose to add any two integers.

What else could we change?

We could change the **starting value**.

We could change **the number of things we add**.

Perhaps it's 1, 2, 3. Or maybe 1, 2, 4. Or maybe 1 isn't included.

What happens then?

The possibilities for exploration are immense.

This is what mathematicians do. They ask questions. They change the rules and then see what happens. It's exploration. It's fun. It's play. It's rich.

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