

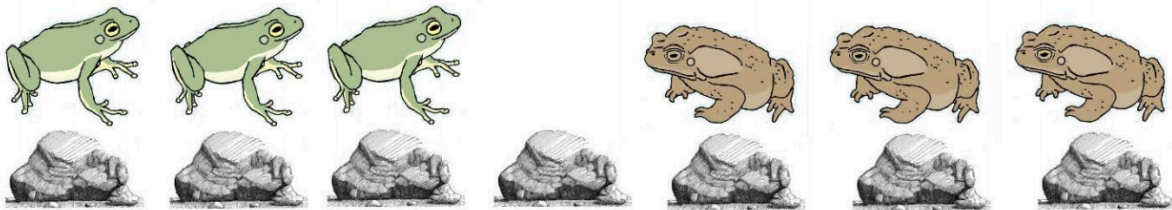
Chapel Hill Math Circle – Beginner’s Group
10.22.18

There are three frogs and three toads resting on rocks. The toads and the frogs would like to exchange places, but they must follow two rules.

First: They can only move forward.

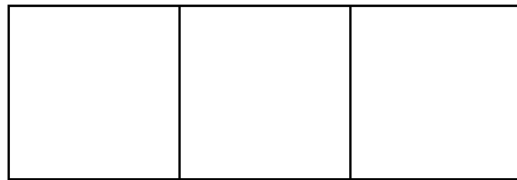
Second: They can move to an empty rock immediately in front or jump over at most one other amphibian to reach an empty rock.

We want to find what is the fewest number of moves it would take to switch the places of the frogs and the toads in the picture below.

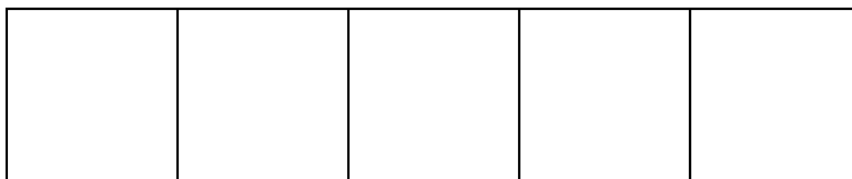


But even if we find a way to switch the frogs and toads, how can we be sure it is the fewest number of moves? And if we increased the number of frogs and toads on both sides, how could we calculate how many moves it would take?

1 Amphibian on both sides



2 Amphibians on both sides



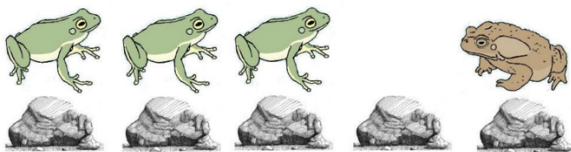
3 Amphibians on both sides



Frogs(left)	Toads(right)	# Slides	# Jumps	Total # of Moves
1	1			
2	2			
3	3			
4	4			
5	5			

If you're able to complete the table, what is the pattern? How could you figure out how many moves it would take if there were 20 frogs and 20 toads?

Start working on this once you've completed the top part. Now we're going to see what the pattern is if we have a different number of frogs than toads. For example look at the picture below. Please work on filling out the table. Try and find a pattern.



Frogs(left)	Toads(right)	# Slides	# Jumps	Total # of Moves
3	1			
3	2			
4	2			
4	3			
5	3			

If you complete this, try a variation where frogs can hop 2 spaces! Find the new pattern.