



Year 7 Homework

Autumn 2

Frogs Investigation



*Interesting fact: did you
know that a group of
frogs is called an
'army'?
(A group of toads is
called a 'knot'.)*

A frog can jump over one other frog onto an empty lily pad or it can hop onto an empty lily pad which is immediately next to it.
Only one frog at a time is allowed on each lily pad.

Now the idea is for the green frogs and red frogs to change places. So the green frogs will end up on the side where the red frogs started and the red frogs will end up where the green frogs began.

The challenge is to do this in as few hops and jumps as possible.



Can you move the green frog to the right and the red frog to the left?
How many moves did it take?

Interesting fact: frogs don't drink water they absorb it through their skin.





Now do the same when there are two green frogs and two red frogs.
What is the smallest number of moves it takes to move the green frogs to the right and the red frogs to the left?

Now work out how many moves it would take for 3, 4 and 5 frogs on each side.

| Number of frogs on each side | Hops | Jumps | Total Moves |
|------------------------------|------|-------|-------------|
| 1 | | | |
| 2 | | | |
| 3 | | | |
| 4 | | | |
| 5 | | | |

What did you find?



What is the relationship between the number of frogs and the number of hops?

What is the relationship between the numbers of frogs and the number of jumps?

What is the relationship between the number of frogs and the total number of moves?



Can you predict how many moves it will take if there are six frogs each side?



Extension Task:

| Number of frogs on each side (n) | Hops | Jumps | Total Moves |
|----------------------------------|------|-------|-------------|
| 1 | | | |
| 2 | | | |
| 3 | | | |
| 4 | | | |
| 5 | | | |

Can you find an *nth term* formula for the total number of moves?



Use this formula to check your predictions are correct.

Interesting fact: frog bones form a ring when the frog is hibernating, just like trees do.



Scientists can use these rings to figure out the age of a frog

