Frogs

First of all I tried what is the quickest amount of moves to find 1 red frog and 1 blue frog. Then 2 red frogs and 2 blue frogs. After that I tried 3 red frogs and 3 blue frogs, then I continued the same thing until 5. I used red cubes and blue cubes as frogs instead because it makes it easier and help imagine the situation. The table below shows my findings.

	Red Frogs					
	1	***2***	***3***	***4***	***5***	***Blue Frogs***
1	3					
2		8				
3			15			
4				24		
5					35	

Now I try to find the formulae so I find the second difference.

1 2 3 4 5

3 8 15 24 35

+5 +7 +9 +11

+2 +2 +2

Quadratic sequences have a common second difference. They are of the form UN = an squared + bn + c. Where the 2nd difference is 2a. So if 2a = 2. So a = 1 because 2/ 2 =1.

So we start with ***n squared***. We square all the bold numbers above. So it will be . . .

1 2 3 4 5

1 4 9 16 25

Now we subtract the two answers. And find the difference. So it will be . . .

3 8 15 24 35

\- 1 4 9 16 25

2 4 6 8 10

+2 +2 +2 +2

Because it is 2 the formulae is n squared + nb. I checked it, and it worked for all the cases. But it does not work for cases such as two red frogs and 3 blue frogs. So with further investigating with cubes, I found the least amount of moves without going backwards in the table below.

	Red Frogs					
	1	***2***	***3***	***4***	***5***	***Blue Frogs***
1	3	5	7	9	11	
2	5	8	11	14	17	
3	7	11	15	19	24	
4	9	14	19	24	29	
5	11	17	24	29	35	

So for 1 blue frog the difference is two between them. The diagram below shows it.

3 5 7 9 11

+2 +2 +2 +2

Therefore it would be 2n + something. I tried adding 1 to each one and it works.

Then I tried 2 blue frogs and I got the difference of 3. The diagram below shows it.

5 8 11 14 17

+3 +3 +3 +3

I repeated the same thing over and over until 5 blue frogs. My results are the following bellow. By the way, M is the amount of moves. B is the number of blue frogs and R is number of red frogs.

B =1 M = 2R +1

B = 2 M = 3R + 2

B = 3 M = 4R + 3

B = 4 M = 5R + 4

B = 5 M = 6R + 5

I found out that the + something is the same amount of blue frogs and the red frogs is the 1 more than blue frogs. So with this information, I came up with the formulae B(R+1)+R. If I expand the brackets the answer would be . . .

BR + B + R

After checking it thoroughly with others, I concluded that the formula is correct.