A Pool Design Pattern



Alfred Jones is a pool designer.

His favorite design involves a rectangular pool, bordered by a rectangular seating area. Alfred models several pool designs using blue and white tiles.

The blue tiles represent the pool’s water, and the white tiles represent the seating area.

The diagrams below show his three smallest pool designs.

Pool 3

Pool 2

Pool 1

**The designs that Alfred made for larger pools have**

**gotten lost, and he needs your help.**

1) Draw a sketch of what Pool 4 and Pool 5 would look like.

2) Record some observations about the pools that could help you describe larger

pools.

3) Describe a method for finding the total number of white tiles needed for the

model of Pool 50.

4) Write a rule that could be used to determine the number of white tiles needed

for any pool in this pattern.

**Remember to:**

* Represent your work in as many ways as possible!
* Model your solution visually and/or algebraically
* Be prepared to share your solution strategy with your classmates!
* Be prepared to question the work of your classmates!
* Be precise ☺

For the teacher:

1)

Pool 5

Pool 4

2) - The Pool # matches the number of blue tiles included in the model

* Each successive pool in the pattern has one additional blue tile, and 2 additional white tile than the preceding pool design.
* The two center white tiles on the ends are constant, but the top and bottom rows of white tiles keep increasing by one.
* The number of white tiles making up the top and bottom rows are always 2 greater than the Pool #
* *students may include different or additional observations*

3) Based on the observations in the previous answers, one way to describe how many white tiles would be needed for a model of Pool 50 might be as follows:

* I know that Pool 50 will have a top and bottom row of white tiles that are 50 + 2 (Pool # plus 2).

50

50

50

* So 52 in the top row, and 52 in the bottom row combine to make 104 white tiles overall.
* Then, I need to include the center white tile on each end, so there will be 2 more than 104, or 106.

1

1

1

1

1

1

4) If ***n*** represents the Pool #, then one way to write a rule for this pattern would be:

2 (*n* + 2) + 2 = w (# of white tiles)

***n* represents the Pool #, and we’re adding two because the white tiles on the top and bottom of the blue tiles stick out one tile further on each end of the blue tiles.**

**Adding 2 represents the two constant white tiles that appear in the center of each end of the model (I’ve shaded them gray).**

**Multiply by 2 because there are two rows (top and bottom) that contain (n + 2) white tiles.**