DO I GET A PRIZE?

Objective: Use problem solving techniques to find patterns in numbers.

Materials: One popsicle stick for each participant
Cards, numbered consecutively, one for each participant

Procedures:

1. Have participants stand around the room. Trainer should read the following:

   On Labor Day, the North Side Mall merchants decided to give gifts to customers under the age of 13 who arrived at the main entrance. The merchants devised a game to decide who would get the gifts. They arranged all of the children in a line and assigned each of them a consecutive number from 1 to the end of the line. Each child also received a stick. The manager then went to child number 2 and took his stick along with the sticks of all even numbered children. The manager then went down the line and took the stick from child number 3 and did one of two things with the sticks of those children whose numbers were multiples of 3. If a child (whose number was a multiple of 3) had a stick already, he took it; if a child did not have a stick already, he gave one to that child. This process continued with the multiples of 4, 5, and so on until the manager had gone through the entire line of children, always starting with the next one in line. Only the children who had sticks at the end of the game received gifts. (He was lucky this Labor Day because only 100 children came for the gifts.) Which children received gifts?

2. Give every participant a stick.

3. Holding numbers where everyone can see them, leader starts picking up the sticks with the person who has the number 2 and continues with all the people whose numbers are multiples of 2.

4. Now, moving to the person whose number is 3, take his/her stick from him/her.

5. When you go to the person whose number is the next multiple of 3 (in this case 6), that person does not have a stick. Give him/her one.

6. Continue this process with those whose numbers are multiples of 4. If the person has a stick, take it; if the person does not have a stick, give him/her one.

7. Continue until you run out of numbers. (Follow these directions until all of the multiples of numbers are used. This will vary according to the number of participants.)

8. If you still have a stick, please stay standing. The rest of you may sit down. Ask, "What kind of pattern do you see with the numbers that are left?" (They are all square numbers.)

9. Tell participants that they will investigate lots of patterns and relationships. They may even discover why only square numbers were left in this activity. (Because they have an odd number of factors.)

Extensions:
1. We used "act it out" as the problem-solving approach to this problem combined with work as a simpler problem (you didn't have 100 participants). Encourage participants to try other methods such as build a chart.

Notes:
1. This is a variation of the famous "locker" problem. If you are doing this with a small group, the pattern may not emerge. If this happens, build a chart so that participants can see the pattern. (You may want to construct a diagram every time you use this activity.)

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Do I Get a Prize? Chart

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
1	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
2	X	O		O		O		O		O		O		O		O		O		O		O		O		O		O		O
3	X		O			X			O			X			O		X			O				X			O			
4	X			X				X		X		O			X	X				X				X				X		X
5	X				O																				X					
6	X		X			O			X			X		X							X					X		X		
7	X					O	O																	O						
8	X			X				O				O				X						X								
9	X								X								X			X							X			
10	X				X					O				X																
11	X										O										X									
12	X		X		X							O						O						X						
13	X												O										O			X				
14	X					X								O																
15	X			X											O										X					
16	X									X		X				O								O						
17	X								X								O										O			
18	X							O				O						O										O		
19	X																		O										O	
20	X								X		O				O					O										O
21	X					X															O									
22	X							X														O								
23																							O							
24				X									X											O						
25																									X					
26																										O				
27																											O			
28																												O		
29																													O	
30																														O

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31  x  x x x x x x x x x x x x x x x x x x x x x x x o
30  x  o o o x o o o o o o o x x x x x x x x x x x x o
29  x  x x x x x x x x x x x x x x x x x x x x x x o
28  x  o o x o o o o o o o x x x x x x x x x x x x o
27  x  x o o o o o x x x x x x x x x x x x x x o
26  x  o o o o o o o o o x x x x x x x x x x x o
25  x  x x x o o o o o o o o o o o o o o o o o o x
24  x  o x o o x o o o o x x x x x x x x x x o
23  x  x x x x x x x x x x x x x x x x x x o
22  x  o o o o o o o o o x x x x x x x x x o
21  x  x o o o o x x x x x x x x x x x x o
20  x  o o o x o o o o x x x x x x x x x o
19  x  x x x x x x x x x x x x x x x x o
18  x  o x x x o o o o x x x x x x x x o
17  x  x x x x x x x x x x x x x x x o
16  x  o o x x x x o o o o o o o o x
15  x  x o o x x x x x x x x x x o
14  x  o o o o x x x x x x x x o
13  x  x x x x x x x x x x x o
12  x  o x o o x x x x x x o
11  x  x x x x x x x x x o
10  x  o o o x x x x x o
9   x  x o o o o o o x
8   x  o o x x x x o
7   x  x x x x x o
6   x  o x x x o
5   x  x x x o
4   x  o o x
3   x  x o
2   x  o
1   x
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