

Name: \_\_\_\_\_

Date: \_\_\_\_\_

## STAND UP AND BE COUNTED

Suppose a class of 32 seated students count off. Students who say an even number stand up. Once that is done, only the students still seated count off. Again, students who say an even number stand up.

- At the end of the second count-off, how many students are still seated?
- How many times will it take before everyone in the class is standing?
- How would the game change if students who say an odd number stand up and students who say an even number remain seated?

Name: Possible Solution

Date: \_\_\_\_\_

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### SOLUTION:

1. Make a table showing 32 students.

1	<del>2</del>	3	<del>4</del>	5	<del>6</del>	7	<del>8</del>	9	<del>10</del>	11	<del>12</del>	13	<del>14</del>	15	<del>16</del>
17	<del>18</del>	19	<del>20</del>	21	<del>22</del>	23	<del>24</del>	25	<del>26</del>	27	<del>28</del>	29	<del>30</del>	31	<del>32</del>

2. Round 1: students who say an even number stand up. Cross out all even numbers. After doing this, I see that only the odd number students are still seated.
3. Round 2: only seated students count off. Again, students who say an even number stand up. I'm going to count off on the table and circle the students who would say even numbers. At the end of Round 2, only these students remain: 1, 1, 9, 13, 17, 21, 25 29. At the end of the second count-off, only 8 students are still seated.
4. Now I need to figure out how many times it will take before everyone in the class is standing so I make a new table with the seated students.

1	<del>5</del>	9	<del>13</del>	17	<del>21</del>	25	<del>29</del>
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5. Round 3: Cross out students who say an even number because they stand up. This leaves 4 students still seated.
6. Round 4: Circle students who say an even number because they stand up. This leaves 2 students.
7. Round 5: Student #1 says "1" and student #17 says "2" so he/she stands up.
8. Round 6. Only student #1 is left and he/she says "1" which is odd, so he/she

remains seated. No matter how many rounds we still play, student #1 will always say "1" or an odd number, so he/she will never stand up. This means that after 5 rounds only one student will remain seated. However, this student will NEVER say an even number and stand up, so the whole class will never be standing in this game.

- How would the game change if students who say an odd number stand up and students who say an even number remain seated?

Basically, everything would go the same, except the odd number students would stand up, leaving the even number students seated. I think that everything would go the same until the very end. After Round 5, only one student would still be seated. In Round 6, he/she would say "1" which is an odd number and he/she would stand. So the big change is that the whole class would be standing after Round 6.

#### ANSWERS:

- At the end of the second count-off, how many students are still seated?
  - **At the end of the second count-off, only 8 students are still seated.**
- How many times will it take before everyone in the class is standing?
  - **After 5 rounds only one student will remain seated. However, this student will NEVER say an even number and stand up, so the whole class will never be standing in this game.**
- How would the game change if students who say an odd number stand up and students who say an even number remain seated?
  - **Basically, everything would go the same, except the odd number students would stand up, leaving the even number students seated. I think that everything would go the same until the very end. After Round 5, only one student would still be seated. In Round 6, he/she would say "1" which is an odd number and he/she would stand. So the big change is that the whole class would be standing after Round 6.**