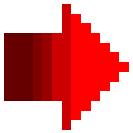
Last One Standing

answers

- Imagine a school assembly with 250 students. Everyone stands up and flips a coin. People with tails sit down. People with heads flip again.
- Do you think anyone will get 6 heads in a row? **YES**
  How many heads in a row do you expect the last one standing to have flipped? **Between 7-9**

- Can you explain your reasoning?



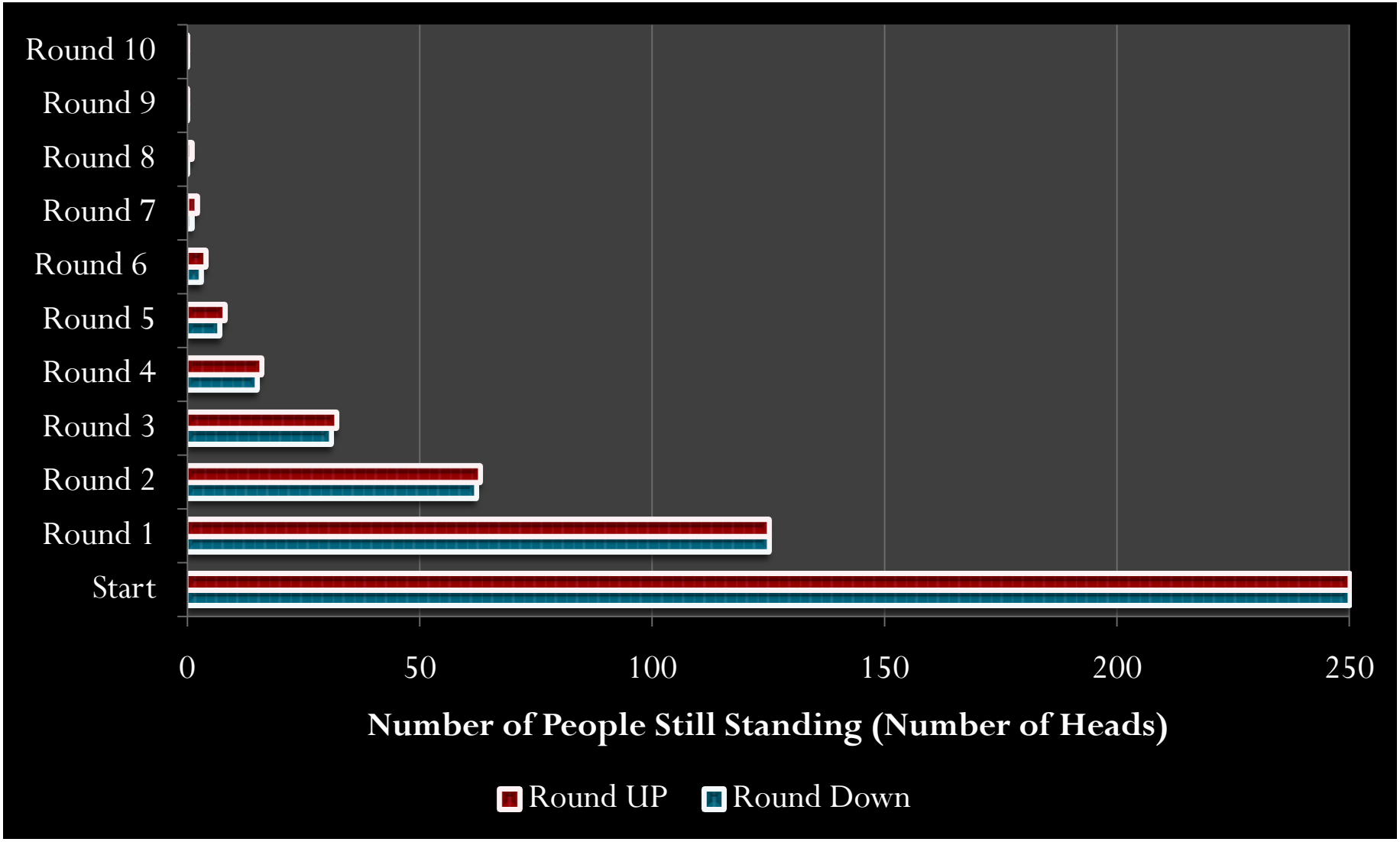
- **We used a large graph to show our reasoning**

Here Is Our Data

	Start	R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	R11	R12
Gretchen	256	132	66	30	15	10	5	3	2	1	0	–	–
Beckett	256	128	68	37	22	11	6	2	1	1	0	–	–
Robin	256	141	64	32	16	10	5	2	1	1	1	0	–
Gretchen	1024	533	249	142	67	28	19	8	2	0	0	–	–
Beckett	1024	506	252	130	63	32	19	11	5	2	1	1	1
Robin	1024	518	268	141	73	35	17	6	4	1	0	–	–
Sample	250	125	62	31	15	7	3	1	1 or 0	○	–		
Sample	250	125	63	32	16	8	4	2	1	1 or 0	0		

LAST ONE STANDING

Mathematical Probability for 250 students



We had to round up or down because sometimes we had an odd number that can't evenly be split in half. Since we can't have a ½ kid, we had to round to a whole number. We tried both rounding up and down to see if it would be similar.

- We found that we had similar results for rounding up and rounding down, so it didn't matter which one you choose. This is how we got these answers:

1. In our previous tests we saw that every time we flipped the coin, the number of kids still standing seemed to split in half. This happens because you have a 1 out of 2 or ½ chance of getting a heads.
2. So, with 250 kids, we kept spliting the number in half until there were no kids left standing.
3. So, it took 9 -10 rounds for all kids to sit down.

Follow Up Questions

- What is the probability of flipping ten heads in a row? **1 in 1,024**

  Each round you have a ½ chance of flipping heads. But when you go for 10 rounds, you multiply by ½ by ½ ten times to find the chances of getting 10 heads in a row. That means you have a 1 in 1,024 chance of getting heads in a row.

  How many people would you need to have in a school assembly for you to expect there to be someone still standing after ten flips? **1,024 kids**

- The probability of winning the lottery jackpot if you buy one ticket is approximately 1 in 14 million.

  There are usually two jackpot winners every week. How many tickets do you think are sold each week? **28,000,000**

  Since there is 14,000,000 people that enter for 1 chance to win, if 2 people are going to win you multiply 14 million twice and you get 28,000,000.

Follow Up Questions

- On October 7th 2010, a woman gave birth to her third child. Her first two children were also born on October 7th, in 2005 and 2007. So all three children in the family have the same birthday. The odds of this happening were incorrectly reported in the newspapers as being 1 in 48 million. Can you work out the correct probability?,

Baby 1 can be born on any day. Baby 2 has to be born on that same day just in a different year. The probability of that is 1 in 365. Also baby 3 has to be born on that same day but in a different year. That is also a probability of 1 in 361 in 365. So to find the probability of both babies you multiply 1/365 x 1/365 = 1/133,225. SO that the chances of that happening is 1/133,225.

- There are more than a million families in the UK with three children. Would you expect there to be other families with three children who share a birthday? **1,000,000÷ 133,000 ≈ 7 families**

Here Is Our Other Data