

BLOSSOMS at Home II

How to Outsmart a Game Show and Win a Car

Key Words: Modeling, applied probability, simulation, quiz show, active learning, reflective learning
Grade levels: 10-12

Dear Student@Home!~

Hi from MIT in Cambridge, Massachusetts, USA! We have a nice project for you to do over the next week. It requires you to look at and think about an MIT BLOSSOMS video lesson, answer questions posed within the videos, work creatively with a computer-based simulation model, and then write a short essay addressing new questions we pose here. Total estimated time to do all these things: only 4 hours or less! Send me your short essay (300 words or less), I promise to read it, and send comments to you! That way you get to “meet” an MIT professor, and I get to meet a dedicated and excited high school student – You! Really great essays will get a Gold Star from us.

Benefits to you – learning new things in STEM, not by rote memorization, but by your own active learning, discovery, reflection and analysis. Watch the one lesson shown below and then write an integrated essay in response to the four questions. Have fun! Looking forward to your emailed essay!

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The Monty Hall Problem or How to Outsmart a Game Show and Win a Car

https://blossoms.mit.edu/videos/lessons/monty_hall_problem_or_how_outsmart_game_show_and_win_car

Questions:

1. The correct policy – to switch doors or to remain on your first chosen door – is very counterintuitive to most people. Try it with your parents and/or siblings and see what they say, and how they respond. Report back to us (without naming names!).
2. If you were asked to explain the intuition about the optimal door-choosing policy to someone not familiar with applied probability, can you do it briefly? Let’s see those sentences!
3. This lesson has an **animated simulation** <https://blossoms.mit.edu/legacy/monty-hall/index.htm> of the Monty Hall problem. It’s almost like a video game! Go to this simulation and spend some time playing with it – to get comfortable. Then, I’d like you to report back on four different runs of the simulation, using AUTO mode of 100 (or 1000) plays each. Do the following runs: (a) 3 doors, using optimal policy; (b) 3 doors, using non-optimal policy; (c) 6 doors, opening 2 doors and following an optimal policy; (d) 6 doors, opening 4 doors and following an optimal policy. In addition, you are also welcome to try any other combination of options! Once you are done with your simulation runs (you should write down the key outcomes of each), write an extended paragraph about what you have learned and how this system behaves.
4. In your own life, can you think of a situation in which the outcome of some situation is uncertain (i.e., probabilistic), you tentatively make a decision, someone gives you partial information, and you are asked to then make a final decision? Please describe briefly.