ENQUIRY LEARNING - PROBABILITY   *ANSWERS*

** Here are a few ideas, but answers may vary **

1. A game show contestant has to choose one of three doors to win a grand prize. Behind one is the major prize, a car, and behind the other two are a pair walking shoes. The probability of the car being behind any given door is one in three. But after the contestant has chosen a door, the host (who knows where the car is) points to another door, different from the one chosen by the contestant, and opens it to show one of the pair of shoes.

    He can always do this because there is only one car, and at least one of the two doors he did not pick has the pair of shoes. Sometimes they both do (when the contestant has chosen the car).

    The game show host turns to the contestant and tells him he now has a 50% chance of winning the car. He asks whether or not he would like to switch doors. Does the contestant's chance of winning the car improve if he now changes his mind and switches to the other closed door (the one he did not choose)? Explain your answer.

    SIMPLE ANSWER: NO, the probability of winning the car does not change because in the end the contestant

    has a 50% chance of choosing the right car no matter which door he chose. So he should not switch.

    HARDER ANSWER: YES, The initial chance of winning the car was 1 out of 3 and the chance of picking the

    wrong door is 2 out of 3, which means if the contestant switches his odds switch so he would now have a

    2 out of 3 chance of picking the door with the car.   ***Try playing 20 times and see what is true. Use switch**

    and no switch for choices. See how many times switch and no switch wins (W) or lose (L).*

2. Sam repeatedly tossed the same two sided coin 99 times. The coin landed on heads 64 times and tails 35 times. Sam feels he has a better chance of getting tails on the next toss. Is his theory true or false? Explain your answer.

    SIMPLE ANSWER: FALSE, the coin does not have a memory and the probability is still 1 out of 2 or 50%.

    HARDER ANSWER: TRUE, the "law of averages" tells us that in the end he should get about the same number

    of heads and tails and since he has more heads he should get tails next.

3. Sam's coin landed on heads again (see problem #2). He decides to try one more time. Which side has the greater chance of showing this time, heads or tails, and why?

    SIMPLE ANSWER: EVEN, the coin does not have a memory and the probability is still 1 out of 2 or 50%.

    HARDER ANSWER: HEADS, he is having a "run" and heads seems a better choice OR could still use

    the "law of averages" and say TAILS.