

Chance Check

Build a model, then test it with results.

GRADE 6 • NY-6.SP.8

NY-6.SP.8 "Develop a probability model and use it to find probabilities of simple events. Compare probabilities from a model to observed frequencies; if the agreement is not good, explain possible sources of the discrepancy."

NAME _____

DATE _____

MODEL AND RESULTS

A probability model uses equally likely outcomes to predict chance. Experimental probability is the number of times an event happens divided by the total number of trials. Compare the two probabilities, then consider chance variation, unequal outcomes, or recording mistakes if they differ.

WORKED EXAMPLE

A game board has 28 equal spaces. Nine spaces are purple. In 42 plays, the marker lands on purple 13 times. Compare the model probability with the observed frequency.



1. Model probability: $9/28$.
2. Observed frequency: $13/42$.
3. Use 84 as a common denominator.
4. $9/28 = 27/84$ and $13/42 = 26/84$.

Answer: Model: $9/28$. Observed: $13/42$. They agree closely.

PRACTICE 4 problems

- 1** A bag has 5 black tiles and 6 white tiles. What is the model probability of drawing a black tile?

ANSWER _____

- 2** A spinner has six equal sections labeled A through F. What is the model probability of landing on C?

ANSWER _____

- 3** A fair coin is flipped 16 times and lands heads 11 times. Find the model probability and the observed frequency. Do they agree closely?

ANSWER _____

- 4** A box has 18 identical tokens, 6 triangle tokens and 12 circle tokens. In 24 draws with replacement, a triangle appears 11 times. Find the model probability and observed frequency. Give one reason they may differ.

ANSWER _____

APPLY IT Show your work

- 1** A game app says 1 of its 12 equal wheel spaces gives a bonus. Use the results to compare the model probability of a bonus with the observed frequency. Explain one possible source of the difference.

BONUS WHEEL TESTS

Result	Number of spins
Bonus	5
No bonus	25

ANSWER _____

- 2** Kai's music app has a shuffle list of 15 songs. Six are dance tracks. In 30 shuffles, dance tracks play 18 times. Compare the model probability with the observed frequency. Do the results agree well? Give one possible reason if they do not.

WORK SPACE

ANSWER _____

CHALLENGE One step up

A game claims that each of 5 character cards is equally likely. In 75 rounds, the cards appear this many times: A, 23; B, 16; C, 14; D, 11; E, 11. Develop the model probability for each card. Does the data support the claim? Explain, and name one possible source of the discrepancy.

WORK SPACE AND ANSWER

PART 1 • PRACTICE

#	PROBLEM	ANSWER
1	A bag has 5 black tiles and 6 white tiles. What is the model probability of drawing a black tile?	5/11
2	A spinner has six equal sections labeled A through F. What is the model probability of landing on C?	1/6
3	A fair coin is flipped 16 times and lands heads 11 times. Find the model probability and the observed frequency. Do they agree closely?	Model: 1/2. Observed: 11/16. They are fairly close.
4	A box has 18 identical tokens, 6 triangle tokens and 12 circle tokens. In 24 draws with replacement, a triangle appears 11 times. Find the model probability and observed frequency. Give one reason they may differ.	Model: 1/3. Observed: 11/24. A possible reason is chance variation.

PART 2 • APPLY IT

- Model: 1/12. Observed: 5/30 = 1/6. The observed frequency is higher. Possible sources include chance variation, unequal wheel spaces, or a recording error.** There were 30 spins total. Divide the 5 bonus results by 30, then compare 1/6 with 1/12.
- Model: 6/15 = 2/5. Observed: 18/30 = 3/5. They do not agree well. The shuffle may not give every song an equal chance, or chance variation may have occurred.** Use 6 out of 15 for the model and 18 out of 30 for the observed frequency. The probabilities differ by 1/5.

CHALLENGE

The model probability for each card is 1/5. Each card would be expected about 15 times. The data does not match the model closely because card A appeared 23 times, which is 8 more than expected. A possible source is that the cards were not equally likely to be selected.

Accept equivalent fractions, including unsimplified observed frequencies. For discrepancy explanations, accept chance variation, unequal likelihoods, biased equipment or selection, or recording errors when appropriate.