LESSON MAKER PRO

Chance Check Lab

Build models, test results, and explain differences.

GRADE 7 · 7.SP.C.7

CCSS.Math.Content.7.SP.C.7 "Develop a probability model and use it to find probabilities of 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 COMPARE

A probability model lists possible outcomes and their probabilities, which add to 1. For equally likely outcomes, probability = favorable outcomes/total outcomes. Compare an observed frequency, successes/trials, to the model. Small differences can happen by chance, but large or repeated differences may mean the model or device is inaccurate.

WORKED EXAMPLE

A game bag has 11 star tokens and 17 circle tokens. Make a model for one draw, then find P(star).

1. Total tokens = 11 + 17 = 28.
2. P(star) = 11/28.
3. P(circle) = 17/28.

Answer: Model: P(star) = 11/28 and P(circle) = 17/28. P(star) = 11/28.

PRACTICE 6 problems

1 A bag model has 4 green, 6 purple, and 2 orange counters. Find P(purple).

ANSWER _____

2 A model says P(win) = 3/8. In 40 plays, how many wins would you expect?

ANSWER _____

3 A model says P(blue) = 1/2. In 30 spins, blue occurs 18 times. Find the observed frequency and tell whether it matches the model exactly.

ANSWER _____

4 A fair number cube has the numbers 1 through 6. Find P(rolling a number less than 4).

ANSWER _____

5 A spinner model predicts P(red) = 1/4. In 24 spins, red appears 9 times. Find the observed frequency. Give one possible reason it differs from the model.

ANSWER _____

6 A simulation is run 50 times. Outcome A occurs 16 times, outcome B occurs 19 times, and outcome C occurs 15 times. Use the observed frequencies to make an experimental probability model.

ANSWER _____

APPLY IT Show your work

1 A music app says it chooses one of 5 playlists with equal chance. During 60 listening sessions, the Chill playlist is chosen 18 times. What probability does the model give for Chill? How many Chill choices would you expect? Compare the observed frequency to the model and give one possible reason for the difference.

WORK SPACE

ANSWER _____

2 An esports club uses a prize wheel with 10 equal spaces: 3 avatar spaces, 2 game-pass spaces, and 5 coin spaces. Develop a probability model for the three prizes. In 80 spins, the game pass is won 10 times. How many game-pass wins does the model predict? Compare the observed frequency to the model and give one possible source of the discrepancy.

WORK SPACE

ANSWER _____

CHALLENGE One step up

A game claims that the probability of earning a rare badge is 1/4 each round. Group A earns 5 badges in 12 rounds. Group B earns 96 badges in 240 rounds. Find each group's observed frequency and expected number of badges. Which group gives stronger evidence that the model may be inaccurate? Explain.

WORK SPACE AND ANSWER

ANSWER KEY

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PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	A bag model has 4 green, 6 purple, and 2 orange counters. Find P(purple).	**6/12 = 1/2**
2	A model says P(win) = 3/8. In 40 plays, how many wins would you expect?	**15 wins**
3	A model says P(blue) = 1/2. In 30 spins, blue occurs 18 times. Find the observed frequency and tell whether it matches the model exactly.	**Observed frequency = 18/30 = 3/5. No, it does not match 1/2 exactly.**
4	A fair number cube has the numbers 1 through 6. Find P(rolling a number less than 4).	**3/6 = 1/2**
5	A spinner model predicts P(red) = 1/4. In 24 spins, red appears 9 times. Find the observed frequency. Give one possible reason it differs from the model.	**Observed frequency = 9/24 = 3/8. Possible reasons include random variation or an uneven spinner.**
6	A simulation is run 50 times. Outcome A occurs 16 times, outcome B occurs 19 times, and outcome C occurs 15 times. Use the observed frequencies to make an experimental probability model.	**P(A) = 16/50 = 8/25, P(B) = 19/50, P(C) = 15/50 = 3/10**

PART 2 · APPLY IT

1. **Model probability = 1/5. Expected Chill choices = 12. Observed frequency = 18/60 = 3/10. The results do not match exactly.** Possible reasons include random variation or that the app does not choose all playlists equally. Use 1/5 because there are 5 equally likely playlists. Multiply 60 by 1/5 to get 12 expected choices, then compare 3/10 with 1/5.
2. **P(avatar) = 3/10, P(game pass) = 2/10 = 1/5, P(coins) = 5/10 = 1/2. The model predicts 16 game-pass wins. Observed frequency = 10/80 = 1/8.** Possible sources include random variation or a wheel that is not truly equal. Write each prize count over 10 for the model. For game passes, multiply 80 by 1/5 to get 16, then compare 1/8 with 1/5.

CHALLENGE

Group A: observed frequency = 5/12, expected badges = 3. Group B: observed frequency = 96/240 = 2/5, expected badges = 60. Group B gives stronger evidence because its much larger number of rounds makes random variation less likely to explain 36 more badges than expected.

Accept equivalent fractions and correctly simplified or unsimplified forms. For discrepancy explanations, accept random variation, a small number of trials, an inaccurate model, or an uneven device when the explanation fits the data.