LESSON MAKER PRO

Chance Data Detectives

Use trial results to estimate what may happen next.

GRADE 6 · NY-6.SP.7

NY-6.SP.7 "Approximate the probability of a simple event by collecting data on the chance process that produces it and observing its long-run relative frequency, and predict the approximate relative frequency given the probability."

NAME _____ DATE _____

USE RELATIVE FREQUENCY

Experimental probability is the number of times an event happens divided by the total number of trials. As you collect more trials, the relative frequency often gets closer to the chance of the event. To predict a future number of events, multiply the experimental probability by the new number of trials.

WORKED EXAMPLE

A spinner lands on green 17 times in 25 spins. Estimate the probability of green, then predict how many green results there may be in 100 spins.

1. Experimental probability = 17/25.
2. 17/25 = 0.68.
3. Predict using 100 × 0.68 = 68.

Answer: The estimated probability is 17/25, or 0.68. About 68 spins may land on green.

PRACTICE 6 problems

1 A coin is flipped 15 times and lands heads 9 times. What is the experimental probability of heads?

ANSWER _____

2 A random app spinner lands on a star 14 times in 20 spins. About how many stars should you predict in the next 50 spins?

ANSWER _____

3 A number cube is rolled 16 times. It shows an odd number 8 times. What is the experimental probability of rolling an odd number?

ANSWER _____

4 A digital spinner lands on blue 27 times in 45 spins. About how many blue results should you predict in the next 90 spins?

ANSWER _____

5 A random number generator selects a multiple of 6 on 7 of 42 tries. What is the experimental probability of selecting a multiple of 6?

ANSWER _____

6 An arcade game gives a prize on 18 of 30 tries. Give the experimental probability of a prize and predict the number of prizes in the next 70 tries.

ANSWER _____

_____

APPLY IT Show your work

1 A game app opens a mystery badge when a player taps a random button. The table shows results from 75 test taps. Estimate the probability of earning a featured badge. Then predict how many featured badges may appear in 120 more taps.

MYSTERY BADGE TEST

Badge type	Number of taps
Featured	15
Common	24
Bonus	36

ANSWER _____

2 Nia shuffles a playlist and records the genre of the song that plays first. Use the results in the table to estimate the probability that the first song is pop. Then predict how many pop songs may play first in 140 more shuffles.

FIRST SONG AFTER A SHUFFLE

Genre	Number of shuffles
Pop	21
Hip-hop	17
Rock	12
Other	10

ANSWER _____

3 Collect your own chance-process data. Your teacher supplies a coin and a tray. Flip the coin into the tray 50 times, recording H or T for every landing on extra paper. Retoss only a coin that lands on its edge or outside the tray. At totals of 10, 25 and 50 trials, record the cumulative heads count and heads relative frequency in the table. Compare each estimate with 1/2: did it get closer, farther away, or remain the same? Use your final estimate to predict heads in 100 more flips. Explain why the observed trend and prediction are not guaranteed.

ACTUAL COIN TRIALS: CUMULATIVE CHECKPOINTS

Total trials	Cumulative heads	Heads / trials	Distance from 1/2
10			
25			
50			

ANSWER _____

CHALLENGE One step up

Two students test the same arcade game. Kai wins 21 times in 40 plays. Mira wins 93 times in 160 plays. Whose results are likely to give a better estimate of the game's chance of a win? Combine both students' data, find the experimental probability of a win, and predict the number of wins in the next 200 plays.

WORK SPACE AND ANSWER

ANSWER KEY # Chance Data Detectives

PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	A coin is flipped 15 times and lands heads 9 times. What is the experimental probability of heads?	**3/5**
2	A random app spinner lands on a star 14 times in 20 spins. About how many stars should you predict in the next 50 spins?	**35**
3	A number cube is rolled 16 times. It shows an odd number 8 times. What is the experimental probability of rolling an odd number?	**1/2**
4	A digital spinner lands on blue 27 times in 45 spins. About how many blue results should you predict in the next 90 spins?	**54**
5	A random number generator selects a multiple of 6 on 7 of 42 tries. What is the experimental probability of selecting a multiple of 6?	**1/6**
6	An arcade game gives a prize on 18 of 30 tries. Give the experimental probability of a prize and predict the number of prizes in the next 70 tries.	**3/5; about 42 prizes**

PART 2 · APPLY IT

1. **1/5; about 24 featured badges** Use 15/75 = 1/5 for the experimental probability. Multiply 1/5 by 120 to predict 24 featured badges.
2. **7/20; about 49 pop songs** There were 60 shuffles, so the experimental probability is 21/60 = 7/20. Multiply 7/20 by 140 to predict 49 pop songs.
3. **Results vary. At each checkpoint use cumulative heads divided by 10, 25 or 50; predict about twice the final heads count in 100 more flips.** Provide a coin, tray and recording paper. Check 50 actual H/T records and matching cumulative counts. For h heads in 50 trials, estimate h/50 and predict 100(h/50) = 2h heads. Distances are |h_n/n - 1/2| at each checkpoint. Example only: 6/10, 13/25, 26/50 give 0.60, 0.52, 0.52; distances 0.10, 0.02, 0.02 and prediction about 52 heads. Accept genuine nonmonotonic trends; more trials do not guarantee every estimate is closer.

CHALLENGE

Mira's results are likely better because she has more trials. Combined experimental probability: 114/200 = 57%. Predict about 114 wins in the next 200 plays.

Accept equivalent fractions, decimals, or percents for probability estimates. Accept predictions labeled as approximate, including “about” before the predicted count. Apply 3 requires actual recorded trials, checkpoint calculations and an observed comparison; an invented data set alone is incomplete. Check the final prediction against the learner’s collected estimate and label it approximate.