LESSON MAKER PRO

Predictions Meet Results

Compare a probability model with what actually happened.

GRADE 7 · 7.DSP.C.14.b

7.DSP.C.14.b "Compare probabilities from a model to observed frequencies, explaining possible sources of discrepancy."

NAME _____ DATE _____

MODEL AND RESULTS

Multiply a model probability by the number of trials to find the expected count. Then compare that count with the observed count, or compare the model probability with the observed fraction. Results may differ because of chance variation or because the model does not fit how the trials were done.

WORKED EXAMPLE

A game says the chance of a bonus is 7/12. A bonus appears 24 times in 36 plays. Compare the expected and observed counts, then give one possible reason they differ.

1. Expected bonuses: 7/12 × 36 = 21.
2. Observed bonuses: 24, which is 3 more than expected.
3. Results can differ from a model because of chance variation.

Answer: The game produced 3 more bonuses than expected. Chance variation is one possible reason.

PRACTICE 6 problems

1 A fair coin is flipped 20 times, and heads appears 13 times. How many heads does the model predict? Is the observed count higher or lower?

ANSWER _____

2 The table shows a spinner app's model and the results of 50 spins. How many blue results does the model predict? Give one possible reason for the difference from the observed count.

SPINNER APP RESULTS

Result	Model probability	Observed count
Blue	1/5	16
Other	4/5	34

ANSWER _____

3 A fair number cube is rolled 60 times. A six appears 8 times. Write the observed fraction of sixes in simplest form. Is it above or below the model probability of 1/6?

ANSWER _____

4 A music app's model predicts that 1/4 of shuffled songs will be upbeat. In 80 songs, 28 are upbeat. How many does the model predict? Give one possible reason other than chance for the difference.

ANSWER _____

5 Both sets use a model probability of 1/2. Which set's observed fraction is closer to the model? Show the two observed fractions.

TWO SETS OF TRIALS

Set	Trials	Times the event occurred
A	20	14
B	100	53

ANSWER _____

6 A card game model gives a rare card a 1/5 chance. No rare cards appear in 10 draws. How many does the model predict? Does this result prove the chance is zero? Explain briefly.

ANSWER _____

APPLY IT Show your work

1 Maya's past free throws suggest a model probability of 3/5 for making a shot. She makes 34 of her next 50 shots. Compare her observed count with the expected count. Give one possible reason they differ.

WORK SPACE

ANSWER _____

2 A trading card company says 2/5 of its packs contain a foil card. Your club opens 100 packs and finds 28 foil cards. Compare the observed fraction with the model probability. If many more packs show a similar rate, what might that suggest?

WORK SPACE

ANSWER _____

CHALLENGE One step up

A game model predicts a win on 1/4 of plays. The table shows two batches. Find the observed fraction of wins for all plays combined. Compare it with the model, then explain why the combined fraction differs even though Batch B matches the model.

GAME BATCHES

Batch	Plays	Wins
A	20	8
B	80	20

WORK SPACE AND ANSWER

ANSWER KEY

Predictions Meet Results

GRADE 7 · 7.DSP.C.14.b

PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	A fair coin is flipped 20 times, and heads appears 13 times. How many heads does the model predict? Is the observed count higher or lower?	**10 heads; the observed count is 3 higher.**
2	The table shows a spinner app's model and the results of 50 spins. How many blue results does the model predict? Give one possible reason for the difference from the observed count.	**10 blue results are expected, but 16 occurred. Chance variation is one possible reason.**
3	A fair number cube is rolled 60 times. A six appears 8 times. Write the observed fraction of sixes in simplest form. Is it above or below the model probability of 1/6?	**8/60 = 2/15; it is below 1/6.**
4	A music app's model predicts that 1/4 of shuffled songs will be upbeat. In 80 songs, 28 are upbeat. How many does the model predict? Give one possible reason other than chance for the difference.	**20 upbeat songs are expected. The app may favor upbeat songs in its shuffle.**
5	Both sets use a model probability of 1/2. Which set's observed fraction is closer to the model? Show the two observed fractions.	**Set A: 14/20 = 7/10. Set B: 53/100. Set B is closer to 1/2.**
6	A card game model gives a rare card a 1/5 chance. No rare cards appear in 10 draws. How many does the model predict? Does this result prove the chance is zero? Explain briefly.	**The model predicts 2 rare cards. No, a rare card could still appear on a later draw; results can vary by chance.**

PART 2 · APPLY IT

1. **The model predicts 30 made shots, and Maya made 34, which is 4 more. She may have improved, or the difference may be due to chance variation.** Multiply 3/5 by 50 to get 30 expected makes. Compare 34 with 30.
2. **The observed fraction is 28/100 = 7/25, which is below 2/5. A similar rate across many more packs might suggest the company's model does not fit the packs being opened.** Write 2/5 as 40/100 and compare it with 28/100. A persistent difference may point to an inaccurate model.

CHALLENGE

Together, the batches had 28 wins in 100 plays, so the observed fraction is 28/100 = 7/25. The model predicts 25/100, so the observed fraction is 3/100 higher. Batch A had 8 wins instead of the 5 predicted, adding 3 extra wins to the combined results.

Accept equivalent fractions and explanations that correctly identify chance variation or a plausible mismatch between the model and the trials. A difference alone does not prove that a model is wrong.