



Worksheet 51: Prediction vs. Actual Results

Name: _____ Date: _____

Score: _____

Section 1: Fluency (Questions 1–10)

Question 1:

Sam rolled a die 20 times. He predicted he would get the number '1' about 3 times. He actually got it 8 times.

What was Sam's **prediction**?

Answer: _____

Question 2:

Using the information from Question 1, what was the **actual result**?

Answer: _____

Question 3:

Was Sam's prediction **exactly correct**? (Yes/No)

Answer: _____

Question 4:

Emma flipped a coin 10 times. She predicted 5 Heads and 5 Tails. She got 7 Heads and 3 Tails.

What did Emma predict for Heads? _____

What did she actually get for Heads? _____

Question 5:

Tom predicted he would roll an even number (2, 4, or 6) about 10 times out of 20 rolls. He rolled an even number 12 times.

Was his prediction close? (Yes/No)

Answer: _____



Question 6:

Look at this data table:

Outcome	Predicted	Actual
Red	5	8
Blue	5	2
Total	10	10

Which colour appeared **more than predicted**?

Answer: _____

Question 7:

Sarah spun a spinner 20 times. She expected to get Yellow about 5 times. She got Yellow 4 times.

Is 4 close to 5? (Yes/No)

Answer: _____

Question 8:

Jake flipped a coin 50 times. He expected about 25 Heads. He got 28 Heads. What is the difference between his prediction and the actual result?

Answer: _____

Question 9:

A class predicted they would roll a '6' about 5 times in 30 rolls. They actually rolled it 7 times. Were they close to their prediction? (Yes/No)

Answer: _____

Question 10:

Lisa predicted 10 Heads in 20 coin flips. She got 10 Heads. Was her prediction exactly correct? (Yes/No)

Answer: _____



Good Job!

Why did the two 4s skip dinner? Because they already 8!





Section 2: Reasoning (Questions 11–20)

Question 11:

Sarah flipped a coin 10 times and got 10 Heads. Is this **possible**?

Answer: _____

Question 12:

Is getting 10 Heads in 10 flips what we **expect** to happen?

Answer: _____

Question 13:

Why didn't Sarah get exactly 5 Heads and 5 Tails?

Circle the best answer:

- A) Bad tossing
- B) Chance (random variation)
- C) The coin is broken

Answer: _____

Question 14:

Tom rolled a die 6 times. He expected to get each number (1, 2, 3, 4, 5, 6) once. Instead, he got three 2s, two 5s, and one 3.

Is this normal variation? (Yes/No)

Answer: _____

Question 15:

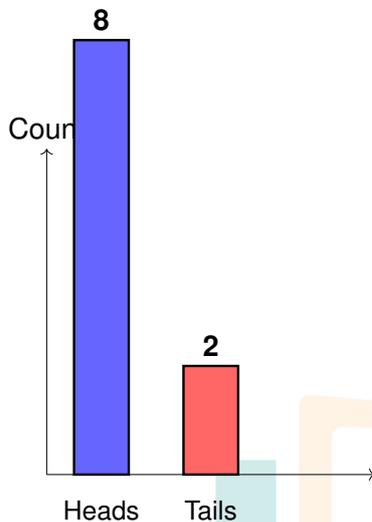
Emma says: "I flipped a coin 20 times and got 12 Heads. My coin must be magic!"

Is Emma correct? Explain.

Answer: _____

**Question 16:**

Look at this bar chart showing coin flip results:



These results came from 10 flips. Is this result fair, or does the coin seem unfair?

Answer: _____

Question 17:

Jake spun a spinner 5 times and got Red every time. The spinner has 4 colours (Red, Blue, Green, Yellow).

Is this **very unusual**? (Yes/No)

Answer: _____

Question 18:

A class rolled a die 60 times. They expected about 10 of each number (1-6). They got: 1(9), 2(11), 3(8), 4(12), 5(10), 6(10).

Are these results close to what we expect? (Yes/No)

Answer: _____

Question 19:

Sarah flipped a coin 100 times and got 48 Heads and 52 Tails. Tom flipped a coin 10 times and got 3 Heads and 7 Tails.

Whose results are closer to "half and half"?

Answer: _____



Question 20:

If you flip a coin only 4 times, is it unusual to get 4 Heads or 4 Tails? Why?

Answer: _____



Good Job!

What do you call a die that tells jokes? A dice-jokey!





Section 3: Challenge (Questions 21–30)

Question 21:

Group A flipped a coin 10 times and got 8 Heads and 2 Tails.

Group B flipped a coin 100 times and got 52 Heads and 48 Tails.

Which group's result is closer to what we expect (half Heads, half Tails)?

Answer: _____

Why? _____

Question 22:

Emma rolled a die 12 times and got a '6' eleven times. Do you think the die is fair?

Answer: _____

Explain: _____

Question 23:

Tom spun a spinner 20 times. It has 4 equal sections (Red, Blue, Green, Yellow). He got: Red(6), Blue(5), Green(5), Yellow(4).

Are these results reasonable? (Yes/No)

Answer: _____

Question 24:

Sarah says: "If I flip a coin 2 times, I will always get 1 Head and 1 Tail." Is she correct?

Answer: _____

Why? _____

Question 25:

Jake did an experiment:

- Trial 1: 10 flips → 7 Heads
- Trial 2: 10 flips → 4 Heads
- Trial 3: 10 flips → 6 Heads

What is the total number of Heads across all trials? _____

Total flips? _____

Is the overall result close to half? _____



Question 26:

A bag has 5 Red marbles and 5 Blue marbles. Emma picks one marble, records the colour, and puts it back. She does this 10 times.

She gets Red 9 times and Blue 1 time. Should she be suspicious? Why?

Answer: _____

Question 27:

Look at these two experiments:

Experiment A: 10 flips \rightarrow 8 Heads, 2 Tails

Experiment B: 1000 flips \rightarrow 520 Heads, 480 Tails

Which experiment shows less variation from "half and half"?

Answer: _____

Question 28:

Tom says: "I flipped a coin 50 times and got 50 Heads. This proves my coin only has Heads on both sides."

Is Tom's reasoning correct? Explain.

Answer: _____

Question 29:

Design a simple experiment to test if a die is fair. Describe what you would do and what results you would expect.



Question 30:

Explain in your own words: Why don't we always get exactly what we predict in probability experiments?

Answer: _____



Good Job!

Why did the probability experiment fail? Because it had too many variables!





Answer Key

Worksheet 51: Prediction vs. Actual Results

- Question 1:**
3 times
- Question 2:**
8 times
- Question 3:**
No
- Question 4:**
Predicted: 5; Actual: 7
- Question 5:**
Yes
- Question 6:**
Red
- Question 7:**
Yes
- Question 8:**
3
- Question 9:**
Yes
- Question 10:**
Yes
- Question 11:**
Yes (possible but unlikely)
- Question 12:**
No
- Question 13:**
B (Chance/random variation)
- Question 14:**
Yes
- Question 15:**
No; 12 out of 20 is close to half (variation is normal)
- Question 16:**
Could be chance, but very lopsided (possibly unfair)
- Question 17:**
Yes
- Question 18:**
Yes
- Question 19:**
Sarah (48/52 vs 3/7)
- Question 20:**
Yes, small samples have more variation
- Question 21:**
Group B; Larger sample = less variation
- Question 22:**
No, very suspicious (11/12 is extreme)
- Question 23:**
Yes
- Question 24:**
No; Could get HH or TT
- Question 25:**
17 Heads; 30 flips; Yes (close to 15)
- Question 26:**
Yes; 9/10 is very extreme for equal chances
- Question 27:**
Experiment B
- Question 28:**
Yes, very strong evidence (or highly unlikely chance)
- Question 29:**
Roll many times (e.g., 60); expect about 10 of each number
- Question 30:**
Because of chance/randomness; results vary naturally



Worksheet 52: Fairness & Lucky Streaks

Name: _____ Date: _____

Score: _____

Section 1: Fluency (Questions 1–10)

Question 1:

Look at these two spinner result charts:

Chart A:

Category	Count
Red wins	5
Blue wins	5
Total	10

Chart B:

Category	Count
Red wins	10
Blue wins	0
Total	10

Which spinner results look **fairer**? Why?

Answer: _____

Question 2:

A coin is flipped 20 times:

- Heads: 11
- Tails: 9

Does this coin seem fair? (Yes/No)

Answer: _____

Question 3:

Tom rolled a die 30 times and got a '6' twenty-five times. Does this die seem fair?

Answer: _____

**Question 4:**

Emma spun a spinner with 4 colours 20 times. Results: Red(5), Blue(5), Green(5), Yellow(5).
Is this spinner fair? (Yes/No)

Answer: _____

Question 5:

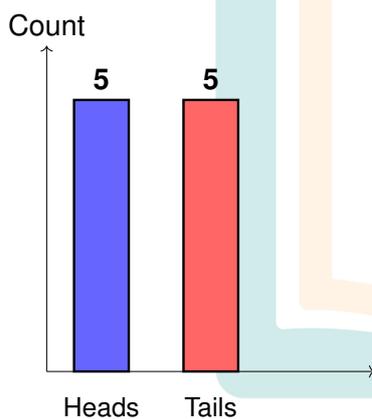
A bag has equal numbers of Red and Blue marbles. Sarah picks 10 marbles (replacing each time) and gets: Red(10), Blue(0).

Should she be suspicious? (Yes/No)

Answer: _____

Question 6:

Look at these coin flip results:



Do these results suggest a fair coin? (Yes/No)

Answer: _____

Question 7:

Jake says: "I flipped a coin 6 times and got 4 Heads and 2 Tails. My coin is unfair!"
Is Jake correct? Why or why not?

Answer: _____

Question 8:

Which result is more suspicious for a fair die?



- A) Rolling a '6' three times in 18 rolls
- B) Rolling a '6' eighteen times in 18 rolls

Answer: _____

Question 9:

A spinner has 2 sections: Red and Blue (equal size). It is spun 50 times. Results: Red(26), Blue(24).

Is this fair? (Yes/No)

Answer: _____

Question 10:

Tom says: "If I flip a coin 100 times, I should get exactly 50 Heads." Is this statement correct?

Answer: _____

Explain: _____



Good Job!

Why did the coin go to therapy? It couldn't decide which side it was on!



Section 2: Reasoning (Questions 11–20)

Question 11:

I have a bag with 10 Red marbles and 1 Blue marble. I pull out a marble 5 times (replacing it each time) and get Blue every time.

Do you think I am **peeking**? Explain.

Answer: _____

Question 12:

Sarah spun a spinner 8 times and got Green every time. The spinner has 4 equal sections (Red, Blue, Green, Yellow).

Is this **very unusual**? (Yes/No)

Answer: _____

Question 13:

Emma rolled a die and got a '6'. She rolled again and got another '6'. She says: "I'm on a lucky streak! I'll definitely get a '6' next time!"

Is Emma correct? Why or why not?

Answer: _____

Question 14:

Tom flipped a coin and got Heads 5 times in a row. What is the chance he gets Heads on the next flip?

- A) Higher than normal
- B) Still 50/50 (equal chance)
- C) Lower than normal

Answer: _____

Question 15:

A class tested a die by rolling it 120 times. They got each number (1-6) exactly 20 times. Is this result suspicious? Why?



Answer: _____

Question 16:

Jake has a spinner that lands on Red 90 times out of 100 spins. The spinner is supposed to be fair (4 equal colours).

What might be wrong?

Answer: _____

Question 17:

Sarah says: "I flipped a coin 10 times and got all Tails. On my next flip, I'm more likely to get Heads to balance things out."

Is Sarah correct? Explain.

Answer: _____

Question 18:

Two students test the same die:

- Student A: 10 rolls → mostly 6s
- Student B: 100 rolls → each number about equal

Which test is more reliable? Why?

Answer: _____

Question 19:

Emma picks a card from a deck of 10 cards (5 Red, 5 Blue) and gets Red 8 times out of 10 picks (replacing the card each time).

Is this strong evidence the deck is unfair?

Answer: _____



Question 20:

Tom says: "The die remembers what I rolled before, so if I roll a '6', I'm less likely to roll another '6'."

Is Tom correct? Explain.

Answer: _____



Good Job!

What did the gambler say to the deck of cards? "I'm not playing with a full deck!"





Section 3: Challenge (Questions 21–30)

Question 21:

If I roll a '6' on a die, is it harder to roll a '6' the next time?

Answer: _____

Explain your answer: _____

Question 22:

Emma conducted 3 experiments with the same coin:

- Experiment 1: 10 flips → 7 Heads
- Experiment 2: 10 flips → 4 Heads
- Experiment 3: 10 flips → 5 Heads

Overall, she got 16 Heads in 30 flips. Is the coin fair?

Answer: _____

Explain: _____

Question 23:

A casino has a roulette wheel. A player notices that Red has come up 20 times in a row. The player says: "Black is due! I'll bet on Black!"

Is this good reasoning? Why or why not?

Answer: _____

Question 24:

Design an experiment to test if a coin is fair. How many flips would you do? What results would make you suspicious?



Question 25:

Tom rolled a die 600 times and got:

- 1: 95 times
- 2: 105 times
- 3: 98 times
- 4: 102 times
- 5: 100 times
- 6: 100 times

Is this die fair? Explain.

Answer: _____

Question 26:

Sarah flipped a coin 4 times and got 4 Heads. Jake flipped a coin 100 times and got 75 Heads.

Whose results are more suspicious? Why?

Answer: _____

Question 27:

A magician has a coin. She flips it 20 times and gets 20 Heads. What are two possible explanations?

1. _____

2. _____

Question 28:

Explain the difference between "possible" and "expected" using a coin flip example.

Answer: _____



Question 29:

A game show has a prize behind 1 of 3 doors. A contestant always picks Door 1. Over 300 shows, Door 1 has the prize 200 times.

Is this game fair? Explain.

Answer: _____

Question 30:

Write a paragraph explaining: "Why do results vary in probability experiments, and how can we tell if something is unfair?"

**Good Job!**

Why don't probability experiments ever get tired? Because they always have random energy!



Answer Key

Worksheet 52: Fairness & Lucky Streaks

Question 1:

Chart A; Results are balanced (equal wins)

Question 2:

Yes (very close to equal)

Question 3:

No (very suspicious)

Question 4:

Yes (perfectly balanced)

Question 5:

Yes (extremely unlikely)

Question 6:

Yes

Question 7:

No; 4-2 is close enough in small sample

Question 8:

B

Question 9:

Yes

Question 10:

No; We expect about 50, but variation is normal

Question 11:

Yes, very suspicious (Blue is very rare)

Question 12:

Yes

Question 13:

No; Each roll is independent (die has no memory)

Question 14:

B (Still 50/50)

Question 15:

Yes; Too perfect (unnaturally even)

Question 16:

Spinner may be weighted/biased toward Red

Question 17:

No; Each flip is independent

Question 18:

Student B; Larger sample more reliable

Question 19:

Possibly, but small sample (10 picks)

Question 20:

No; Die has no memory (independent events)

Question 21:

No; Each roll is independent/equal chance

Question 22:

Yes; 16/30 is close to half (15)

Question 23:

No; Each spin is independent (no "due" outcomes)

Question 24:

Many flips (e.g., 100); Suspicious if very far from 50/50

Question 25:

Yes; All counts near 100 (expected)

Question 26:

Jake's; 75/100 is very extreme; 4/4 can happen by chance

Question 27:

1. Trick coin (both sides Heads)
2. Extremely lucky (or magic trick)

Question 28:

Possible: Can get 10 Heads in 10 flips
Expected: About 5 Heads

Question 29:

No; Door 1 wins 2/3 of the time (not 1/3)

Question 30:

Check paragraph: Should mention randomness/chance causes variation; Large differences from expected suggest unfairness