

Just In Time Quick Check
Standard of Learning (SOL) 7.8b

Strand: Probability and Statistics

Standard of Learning (SOL) 7.8b

The student will investigate and describe the difference between the experimental probability and theoretical probability of an event.

Grade Level Skills:

- Describe changes in the experimental probability as the number of trials increases.
- Investigate and describe the difference between the probability of an event found through experiment or simulation versus the theoretical probability of that same event.

Just in Time Quick Check

Just in Time Quick Check Teacher Notes

Supporting Resources:

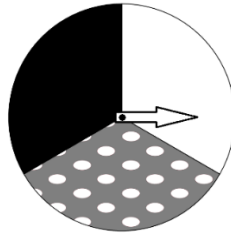
- VDOE Mathematics Instructional Plans (MIPS)
 - [7.8ab - What are the Chances?](#) (Word) / [PDF](#)
- VDOE Algebra Readiness Remediation Plans
 - [Experimental vs. Theoretical](#) (Word) / [PDF](#)
 - [Rock Paper Scissors](#) (Word) / [PDF](#)
- VDOE Word Wall Cards: Grade 7 ([Word](#)) | ([PDF](#))
 - Probability
 - Theoretical Probability
 - Experimental Probability
- Other VDOE Resources
 - [Beat the Odds \[eMediaVA\]](#)
 - [Probability and the Law of Large Numbers \[eMediaVA\]](#)
- Desmos Activity
 - [Last Taco](#)

Supporting and Prerequisite SOL: [7.8a](#), [6.2a](#), [6.2b](#), [5.2a](#), [5.2b](#), [5.15](#)

SOL 7.8b - Just in Time Quick Check

1. Matthew has a spinner that is divided into three congruent sections. He spins the arrow on the spinner 100 times and records the section on which the arrow lands. His results are shown in the table.

Spinner



Results of 100 Spins

Section	Number of Spins
Shaded	36
Unshaded	25
Patterned	39

Based on these results, is the theoretical probability of the arrow landing on the unshaded section greater than, less than, or equal to the experimental probability of the arrow landing on the unshaded section? Explain your thinking.

2. A bag of equally-sized marbles contains 6 green marbles, 8 blue marbles, and 10 red marbles. Amber reached in the bag picked a marble without looking, recorded its color, and returned the marble to the bag. Her data is recorded in the table.

Amber's Results

Color Marble	Number of times drawn
Green	22
Blue	16
Red	10

Based on these results, which color marble has an experimental probability equal to its theoretical probability? Explain your reasoning.

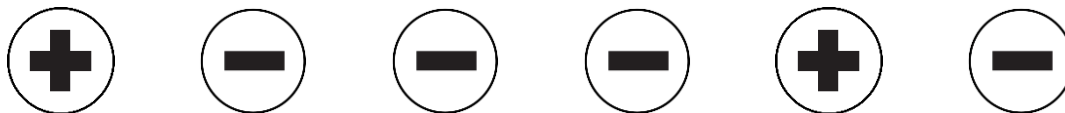
3. Ashley rolled a fair number cube. The results of 10 rolls are shown.

Results of 10 Rolls

Number Landing Face Up	Frequency
1	3
2	2
3	1
4	1
5	2
6	1

Ashley will roll the fair number cube an additional 1000 times. Should she expect the experimental probability of the fair number landing with a 4 facing up to increase or decrease? Explain your thinking.

4. John found a fair coin with a positive sign on one side and a negative sign on the other. He flipped the fair coin 6 times, and the results are shown.

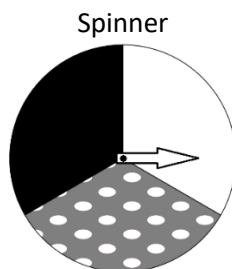


If the coin is flipped an additional 100 times, John should expect the experimental probability of the coin landing with a positive sign face up to get closer to _____. Explain your thinking.

SOL 7.8b - Just in Time Quick Check Teacher Notes

Common Errors/Misconceptions and their Possible Indications

1. Matthew has a spinner that is divided into three congruent sections. He spins the arrow on the spinner 100 times and records the section on which the arrow lands. His results are shown in the table.



Results of 100 Spins

Section	Number of Spins
Shaded	36
Unshaded	25
Patterned	39

Based on these results, is the theoretical probability of the arrow landing on the unshaded section greater than, less than, or equal to the experimental probability of the arrow landing on the unshaded section? Explain your thinking.

A common error is a student incorrectly calculating the theoretical and/or experimental probability. This error may indicate the student does not understand what theoretical and experimental probability are and how to calculate them. This student would benefit from experiences where they calculate the theoretical and experimental probability of the same event. Refer to the Mathematics Instructional Plan 7.8ab - What are the Chances? and the Algebra Readiness Remediation Plan Experimental vs. Theoretical.

Another common error students may make is incorrectly comparing the theoretical probability of $\frac{1}{3}$ and the experimental probability of $\frac{25}{100}$. This may indicate students need more experiences comparing rational numbers. Refer to standard 6.2 in the Grade 6 Curriculum Framework. Converting the two probabilities into their percent equivalents of $33\frac{1}{3}\%$ and 25% may also prove beneficial.

2. A bag of equally-sized marbles contains 6 green marbles, 8 blue marbles, and 10 red marbles. Amber reached in the bag picked a marble without looking, recorded its color, and returned the marble to the bag. Her data is recorded in the table.

Amber's Results

Color Marble	Number of times drawn
Green	22
Blue	16
Red	10

Based on these results, which color marble has an experimental probability equal to its theoretical probability? Explain your reasoning.

A common error is students may make is choosing red because they see there are 10 red marbles in the bag and a red marble was drawn 10 times in the experiment. This error may indicate students not having conceptual understanding of the difference between theoretical and experimental probability. The Math 7 Word Wall Cards could be used to reinforce the difference between the theoretical and experimental probability of the same event.

Another misconception students may have is recognizing that the two ratios of $\frac{8}{24}$ and $\frac{16}{48}$ are equivalent. This may indicate that students need more experience with equivalent ratios. Refer to SOL 6.1 or 6.12a in the Grade 6 Curriculum Framework.

3. Ashley rolled a fair number cube. The results of 10 rolls are shown.

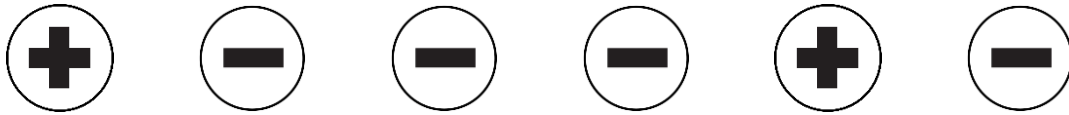
Results of 10 Rolls

Number Landing Face Up	Frequency
1	3
2	2
3	1
4	1
5	2
6	1

Ashley will roll the fair number cube an additional 1000 times. Should she expect the experimental probability of the fair number landing with a 4 facing up to increase or decrease? Explain your thinking.

A common misconception a student may have is the belief that experimental probability remains constant. This misconception may indicate that the student does not have a conceptual understanding of experimental probability, making it difficult to understand that the experimental probability could increase or decrease as the number of trials increases. This student may benefit from acting out experiments and documenting the experimental probability several times to see how the experimental probability changes as the number of trials increase.

4. John found a fair coin with a positive sign on one side and a negative sign on the other. He flipped the fair coin 6 times, and the results are shown.



If the coin is flipped an additional 100 times, John should expect the experimental probability of the coin landing with a positive sign face up to get closer to _____. Explain your thinking.

A common error may be a student listing $33\frac{1}{3}\%$ which is the experimental probability of the six coin flips. This may indicate that the student does not understand that the experimental probability approaches the theoretical probability as the number of trials increases. This student may benefit from conducting experiments while recording both the theoretical and experimental probabilities. Refer to the Mathematics Instructional Plan 7.8ab - What are the Chances? and the Algebra Readiness Remediation Plan Experimental vs. Theoretical.