

Richmond Public Schools

Curriculum Framework

7th Grade Math

Strand: Probability and Statistics	
7.8 The student will a) determine the theoretical and experimental probabilities of an event; and b) investigate and describe the difference between the experimental probability and theoretical probability of an event.	
Suggested Pacing	
Third Nine Weeks – 7 days	
Spiraling Standards	
Spiraling Down: 5.15 The student will determine the probability of an outcome by constructing a sample space or using the Fundamental (Basic) Counting Principle. 4.13 The student will a) determine the likelihood of an outcome of a simple event; b) represent probability as a number between 0 and 1, inclusive; and c) create a model or practical problem to represent a given probability.	Spiraling Up: 8.11 The student will a) compare and contrast the probability of independent and dependent events; and b) determine probabilities for independent and dependent events.
Essential Questions	Common Misconceptions
What is the difference between the theoretical and experimental probability of an event? <i>Theoretical probability of an event is the expected probability and can be found with a formula. The experimental probability of an</i>	<ul style="list-style-type: none">As students develop the concept of experimental probability they forget how to recognize and demonstrate theoretical probability.Students have trouble identifying the total sample space.

Richmond Public Schools

Curriculum Framework

7th Grade Math

event is determined by using the results (data) from a simulation or an experiment.

How does experimental probability change when the number of trials change?

Experimental probability gets closer to the theoretical probability as the number of trials increase.

- Students have trouble interpreting tables and graphs to find the experimental probability.
- Students struggle to simplify fractions.

Understanding the Standard

- In general, if all outcomes of an event are equally likely, the probability of an event occurring is equal to the ratio of desired outcomes to the total number of possible outcomes in the sample space.
- The probability of an event occurring can be represented as a ratio or equivalent fraction, decimal, or percent.
- The probability of an event occurring is a ratio between 0 and 1.
 - A probability of 0 means the event will never occur.
 - A probability of 1 means the event will always occur.
- The theoretical probability of an event is the expected probability and can be determined with a ratio.
- If all outcomes of an event are equally likely, the theoretical probability of an event =
$$\frac{\text{number of possible favorable outcomes}}{\text{total number of possible outcomes}}$$

Essential Knowledge and Skills

The student will use problem solving, mathematical communication, mathematical reasoning, connections, and representations to

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

Richmond Public Schools

Curriculum Framework

7th Grade Math

<ul style="list-style-type: none"> ● The experimental probability of an event is determined by carrying out a simulation or an experiment. ● The experimental probability of an event = $\frac{\text{number of times desired outcomes occur}}{\text{number of trials in the experiment}}$ ● In experimental probability, as the number of trials increases, the experimental probability gets closer to the theoretical probability (Law of Large Numbers). 	
Vocabulary	Instructional Activities Organized by Learning Objective
Probability Theoretical Probability Experimental Probability Percent Ratio Event Trials Simplify Model Evaluate Simulation Experiment Data Numerator Denominator	<p>Virginia Department of Education <u>What are the Chances?</u></p> <p>Textbook Virginia Math Connects, Course 2, ©2012, Price, et al, McGraw-Hill School Education Group 1: Probability, page(s) 429 – 433; Experimental and Theoretical Probability, page(s) 458 – 462; Simulations pg 463</p> <p>Notes <u>7.8 – Theoretical and Experimental Probability Note page</u></p> <p>Resources</p> <ul style="list-style-type: none"> ● Print <ul style="list-style-type: none"> ○ Virginia Coach, New SOL Edition, Mathematics, Grade 7, @2018, Triumph Learning pg(s) 118 - 129 ○ <u>Theoretical and Experimental Probability Guided Notes and Activity</u> ○ <u>Theoretical and Experimental Probability Practice</u> ● Technology-based
Assessment	

Richmond Public Schools

Curriculum Framework

7th Grade Math

	<ul style="list-style-type: none">○ BrainPop<ul style="list-style-type: none">■ <u>Basic Probability</u>○ KhanAcademy<ul style="list-style-type: none">■ <u>Experimental Probability</u>○ LearnAlberta<ul style="list-style-type: none">■ <u>Theoretical Probability</u>○ PBS Learning<ul style="list-style-type: none">■ <u>Beat the Odds – Explore Theoretical Probability</u> <p>Stations <u>Probability Math Centers</u> <u>Probability Math Stations</u></p>
Cross-Curricular Connections	Tiered Differentiations
<p>Science – Students apply probability to Punnett squares with X, Y genes.</p>	<p>(Tier One) Students are given a combination of dependent and independent events. Students are then asked to determine if they are dependent or independent, and to explain how they would find the probability. Students will then find the probability of each.</p> <p>(Tier Two) With partners, students will utilize an online spinner to tally the results of spinning a spinner 30 times to create a chart. Next students will be asked to answer the following utilizing their chart: What is the theoretical probability for each space; What is the experimental probability for each space. Lastly students will decide which space on the spinner has the closest theoretical and experimental probabilities.</p> <p>(Tier Three) The students will complete a graphic organizer to define and practice theoretical and experimental probability. Once complete, students will work in pairs to complete an activity where they calculate the theoretical and experimental probability of spinning a spinner 10 times utilizing an online spinner as the teacher monitors the class. Lastly, students will highlight the space which has the closest theoretical and experimental probability.</p>

Richmond Public Schools
Curriculum Framework
7th Grade Math