

Let's Do Some Math

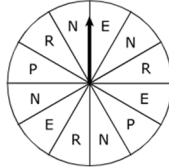
Which One Doesn't Belong

Standards Unpacking		
Key	Standard	Prerequisites/Vocabulary
Put a box around the <u>conceptual component</u> of the standard. Underline the <u>procedural/fluency component</u> of the standard. Put a cloud around the <u>application component</u> of the standard.	7.SP.5- Understand that the probability of a chance event is a number between 0 and 1 that expresses the likelihood of the event occurring. Larger numbers indicate greater likelihood of the event occurring. Larger numbers indicate greater likelihood. A probability near 0 indicates an unlikely event, a probability around 1/2 indicates an event that is neither unlikely nor likely, and a probability near 1 indicates a likely event.	What prior knowledge should my students have?
		What vocabulary/ notation should students know for this standard?
	7.SP.6- Approximate the probability of a chance 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. <i>For example, when rolling a number cube 600 times, predict that a 3 or 6 would be rolled roughly 200 times, but probably not exactly 200 times.</i>	What prior knowledge should my students have?
		What vocabulary/ notation should students know for this standard?
	7.SP.7- Develop a probability model and use it to find probabilities of events. Compare probabilities from a model to observed frequencies; if the agreement is not good, explain possible sources of the discrepancy.	What prior knowledge should my students have?
		What vocabulary/ notation should students know for this standard?

Standards Unpacking		
Key	Standard	Prerequisites/Vocabulary
Put a box around the conceptual component of the standard. Underline the <u>procedural/fluency component</u> of the standard. Put a cloud around the  application component of the standard.	7.SP.7a- Develop a uniform probability model by assigning equal probability to all outcomes and use the model to determine probabilities of events. <i>For example, if a student is selected at random from a class, find the probability that Jane will be selected and the probability that a girl will be selected</i>	What prior knowledge should my students have?
		What vocabulary/ notation should students know for this standard?
	7.SP.7b- Develop a probability model (which may not be uniform) by observing frequencies in data generated from a chance process. <i>For example, find the approximate probability that a spinning penny will land heads up or that a tossed paper cup will land open-end down. Do the outcomes for the spinning penny appear to be equally likely based on the observed frequencies?</i>	What prior knowledge should my students have?
		What vocabulary/ notation should students know for this standard?
	7.SP.8- Find probabilities of compound events using organized lists, tables, tree diagrams, and simulation.	What prior knowledge should my students have?
		What vocabulary/ notation should students know for this standard?
	7.SP.8a- Understand that, just as with simple events, the probability of a compound event is the fraction of outcomes in the sample space for which the compound event occurs.	What prior knowledge should my students have?
		What vocabulary/ notation should students know for this standard?

Standards Unpacking		
Key	Standard	Prerequisites/Vocabulary
Put a box around the conceptual component of the standard. Underline the <u>procedural/fluency component</u> of the standard. Put a cloud around the  application component of the standard	7.SP.8b- Represent sample spaces for compound events using methods such as organized lists, tables and tree diagrams. For an event described in everyday language (e.g., "rolling double sixes"), identify the outcomes in the sample space which compose the event.	What prior knowledge should my students have?
		What vocabulary/ notation should students know for this standard?
	7.SP.8c- Design and use a simulation to generate frequencies for compound events. <i>For example, use random digits as a simulation tool to approximate the answer to the question: If 40% of donors have type A blood, what is the probability that it will take at least 4 donors to find one with type A blood?</i>	What prior knowledge should my students have?
		What vocabulary/ notation should students know for this standard?

Probability Questions

1. Jonah received a gift card to a movie theater. The gift card allows him to choose one type of movie, one snack, and one drink. His options are shown in the list below. - Movies: drama, action, comedy - Snacks: popcorn, chips, candy - Drinks: water, juice He chooses one movie, one snack, and one drink at random. What is the probability that Jonah chooses a comedy, chips, and juice? Write your answer as a fraction.	2. At a deli, customers buying a sandwich can choose one type of bread, one type of meat, one type of cheese. The options for each sandwich are listed below. - Bread: white or wheat - Meat: turkey or beef - Cheese: american, swiss, or cheddar Assuming each choice is equally likely, what is the probability a customer will choose a sandwich with white bread, turkey, and swiss cheese?																																																																																								
3. Based on a weather report, the probability that it will rain tomorrow is 0.13. Which word describes the likelihood that it will rain tomorrow? Certain, Impossible, Likely, or Unlikely	4. Kerry has a bag containing white and yellow marbles. Kerry randomly select one marble from the bag, records the result, and returns the marble to the bag. The results of the first 65 sections are shown below. - A white marble was selected 41 times. - A yellow marble was selected 24 times. Based on the results, what is the probability that the next marble Kerry selects, rounded to the nearest percent will be white?																																																																																								
5. A spinner has five equal-sized sections colored blue, red, orange, yellow, and green. The arrow on the spinner was spun 50 times during an experiment. The results are shown in the table below. <table><tr><th colspan="2">Results of Experiment</th></tr><tr><th>Color</th><th>Frequency</th></tr><tr><td>Blue</td><td>12</td></tr><tr><td>Red</td><td>15</td></tr><tr><td>Orange</td><td>6</td></tr><tr><td>Yellow</td><td>10</td></tr><tr><td>Green</td><td>7</td></tr></table> Based on the results, what is the experimental probability that on any one spin, the arrow will land on the red section?	Results of Experiment		Color	Frequency	Blue	12	Red	15	Orange	6	Yellow	10	Green	7	Mr. Norton uses a fair spinner with 12 equal regions to determine the topic for each day's warm-up lesson in math class. Topic Spinner <table><tr><th colspan="2">KEY</th></tr><tr><td>E</td><td>= Expressions and Equations</td></tr><tr><td>N</td><td>= Number Sense</td></tr><tr><td>P</td><td>= Probability and Statistics</td></tr><tr><td>R</td><td>= Ratios and Proportions</td></tr></table> Mr. Norton plans to spin the spinner 120 times during the school year. Create a bar graph that shows the best prediction for the number of times each topic will be selected. <table><tr><th colspan="5">Relative Frequencies</th></tr><tr><td rowspan="12">Number of Expected Times</td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td></tr><tr><td></td><td>E</td><td>N</td><td>P</td><td>R</td></tr><tr><td colspan="5">Topics</td></tr></table>	KEY		E	= Expressions and Equations	N	= Number Sense	P	= Probability and Statistics	R	= Ratios and Proportions	Relative Frequencies					Number of Expected Times																																																		E	N	P	R	Topics				
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A box contains paper clips of three different sizes. The number of each size of a paper clip are listed below. 100 small paper clips 250 medium paper clips 150 large paper clips One paper clip is randomly selected from the box. What is the probability that the paper clip is selected is either small or medium?	A student tosses a fair coin with heads (H) one one side and tails (T) on the other, and rolls a fair number cube with faces numbered 1 through 6. How many different outcomes are possible.																																																																																								
A spinner has 12 sections of equal size. The sections are numbered 1 to 12. The arrows on the spinner will be spun once. Consider the following events. - J is the event that the arrow stops in a section with an even number. - K is the event that the arrow stops in a section with a number greater than 2. - L is the event that the arrow stops in the section with the number 10. What event goes with each of the following: Unlikely, Neither Likely nor Unlikely, Likely	A company sells artwork using a website. Information about the number of people that visited the website and the number of pieces of artwork purchased on a single day is listed below. 117 people did not purchase any artwork 24 people purchased one piece of artwork 9 people purchased more than one piece of artwork Based on the data that day, what is the probability that the next person to visit the website will purchase more than one piece of artwork?																																																																																								

LESSON 32: Introduction to Probability

Directions: Complete the following SOLVE problem with your teacher. You will only complete the S step.

Josh and Daniel are playing a probability game in math class. Each of the boys rolls a fair number cube with the numbers 1, 2, 3, 4, 5, and 6 on the cube. Josh is trying to roll a number less than 3. Daniel is trying to roll an even number. If they each roll the number cube one time, which student is more likely to roll one of their numbers?

S Underline the question.

This problem is asking me to find _____.

Directions: Complete this page with your teacher and partner.

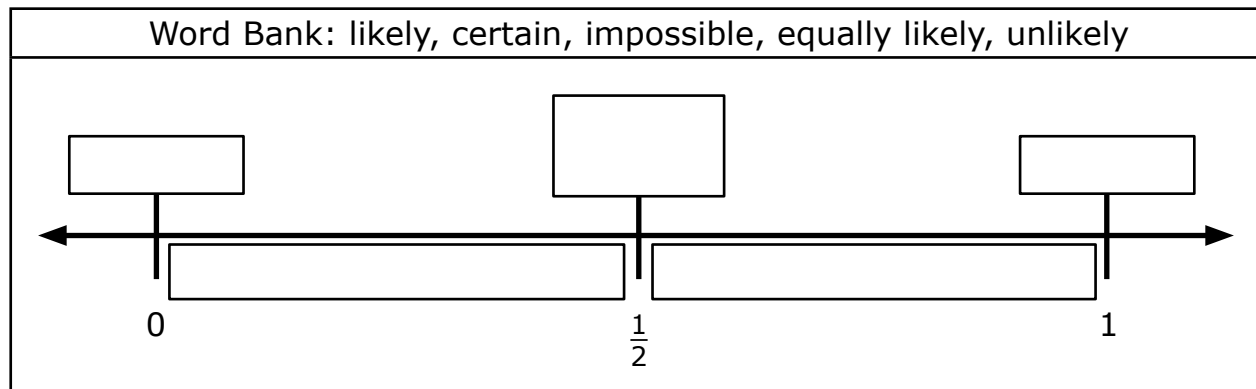
	Event 1 Rolling a 7	Event 2 Rolling a number less than 2	Event 3 Rolling an even number	Event 4 Rolling a number greater than 1	Event 5 Rolling a number from 1 - 6
Explanation					
What does this mean?					
Likelihood					

Word Bank:

certain	impossible	likely	unlikely	equally likely
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LESSON 32: Introduction to Probability

Directions: Complete this page with your teacher and partner.



1. A bag of marbles contains 3 red marbles, 15 green marbles, 10 blue marbles, and 2 yellow marbles. All the marbles have designs on them. Complete the table.

Likelihood	Impossible	Unlikely	Equally Likely	Likely	Certain
Event	Picking a purple marble	Picking a yellow marble	Picking a green marble	Picking a green or blue marble	Picking a marble that has a design
Explanation					

2. A spinner has 8 equal sections that are numbered from 1 – 8. Complete the table with your partner to create an event for each section and give an explanation to support your event.

Likelihood	Impossible	Unlikely	Equally Likely	Likely	Certain
Event					
Explanation					

LESSON 32: Introduction to Probability

Directions: Complete this page with your teacher and partner.

Likelihood can be expressed with words such as “unlikely” or “certain”, but sometimes we need to find the numerical value to identify the likelihood of an event occurring.

In order to determine the numerical value that identifies the likelihood of an event occurring, we need to know how many different ways an event can happen. All the ways an event could occur are called the _____.

Use the information in the chart below to find the possible outcomes for each event.

Event	Possible Outcomes	Number of Possible Outcomes
1. A coin is flipped and will land on heads or tails.		
2. A number cube labeled 1 - 6 is rolled.		
3. A spinner with 8 equal sections labeled 1 - 8 is spun.		
4. A marble is chosen from a bag containing 7 red, 6 green, and 8 blue marbles.		
5. A bag of change contains 4 nickels, 1 quarter, 5 dimes, and 15 pennies. A coin is chosen.		

6. Look at Question 4 in the chart. How many marbles are there in the event? ____
What is the number of possible outcomes? ____ Why are there only 3 possible outcomes?

7. Look at Question 5 in the chart. How many coins are there in the event? ____
What is the number of possible outcomes? ____ Why are there only 4 possible outcomes?

8. Record the number of possible outcomes for each event in Questions 4 – 5.

9. If we list the possible outcomes for an event, we are giving all possible choices for a sample. This is called the _____.

10. Why is it important to list the sample space for an event?

Lesson 35: Compound Probability

Directions: Complete the following SOLVE problem with your teacher.

Leslie has a fair number cube labeled 1-6, and she is trying to figure out what the chances are of rolling specific numbers on the cube. What is the probability that Leslie will roll a 2 or a 3 on the number cube?

S Underline the question.

This problem is asking me to find _____.

O Identify the facts.

Eliminate the unnecessary facts.

List the necessary facts.

L Write in words what your plan of action will be.

Choose an operation or operations.

V Estimate your answer.

Carry out your plan.

E Does your answer make sense? (Compare your answer to the question.)

Is your answer reasonable? (Compare your answer to the estimate.)

Is your answer accurate? (Check your work.)

Write your answer in a complete sentence.

Lesson 35: Compound Probability

Directions: Complete this page with your teacher and partner. Refer to the SOLVE problem on S457 to answer the questions below.

In the SOLVE problem on the previous page, we determined that the probability of rolling a 2 or a 3 on the number cube was _____. Part of Leslie's math project was to work with the probability of two separate events and determine the probability of certain outcomes. The teacher asked Leslie to add flipping a red and yellow counter as a second event with the desired outcome of a red.

1. How many events are involved in this scenario?	
2. What are the events?	
3. How did we determine the probability of rolling a 2 or 3?	
4. How can we determine the probability of flipping a counter and having it land on red?	
5. What is the probability of flipping a counter and having it land on red?	

6. One way that we can find the probability is to look at all of the possible outcomes. What is another name for the possible outcomes you have already learned?
7. Looking at the two events, we can make a list to see all of the different combinations of outcomes. Using the space below, list all of the outcomes of the two events.
8. How many total outcomes are possible?
9. How many outcomes have a 2 or a 3 and red? Circle and list them.
10. What is similar about finding the probability using a list and using the fraction method?
11. How do we find probability? _____. What is the probability of rolling a 2 or 3 and then the counter landing on red?

Lesson 35: Compound Probability

Directions: Complete this page with your partner.

Mia is also rolling a number cube, but instead of a counter, she's going to be pulling marbles out of a bag. The bag contains one red marble, one green marble, and one blue marble. If Mia rolls the number cube and then picks one marble out of the bag, what is the probability that she will roll a number greater than 4 and pick a blue marble?

1. How many events are involved in this scenario?	
2. What are the events?	

Let's make a list to determine all the possible outcomes.

- Using the number cube as the first event, list the sample space for the first event.
- If the second event is picking the marble, what are the possible outcomes?
- Make a list of all the possible outcomes
- How many possible outcomes are in the list?
- Circle the favorable outcomes in the list. How many favorable outcomes are there?
Explain.
- What is the probability of rolling a number greater than 4 and drawing a blue marble?

Lesson 35: Compound Probability

Directions: Complete this page with your teacher and partner.

Mia is rolling a number cube and pulling marbles out of a bag. The bag contains one red marble, one green marble, and one blue marble. If Mia rolls the number cube and then picks one marble out of the bag, what is the probability that she will roll a number greater than 4 and pick a blue marble?

We can also determine the probability of multiple events using a second method.

1. First, list the possible outcomes for the toss of the number cube.
2. Below each of the outcomes from the first event, write all of the possible outcomes of the second event so that each of these outcomes branches off of the outcomes of the first event. (When listing marbles, you may use the first letter of the color.)



3. This particular diagram with the branching is referred to as a _____.
4. Looking at the bottom row, or the ends of the branches on the diagram, you can see all of the possible outcomes for this compound event. How many possible outcomes are there?
5. Which numbers are greater than 4?
6. How many of the branches represent a possible outcome of a number greater than 4 and a blue marble? Circle them in the tree diagram.
7. How do we find probability?
8. What is the probability of rolling a number greater than 4 and choosing a blue marble?

Understanding Reasoning Questions

Use this sheet as a reflection tool to support the understanding of the evidence statement around the reasoning questions. After you engage/learn about the questions, use the tool to make notes around your take aways and implementation ideas.

Current Unit Topics:	
	Evidence Statement for Reasoning
What Content Standards Are Addressed in This Evidence Statement from the Current Unit?	
Takeaways About the Statement – What Do Students Need to Be Able to Do	
What Should Be Evident in a Student Response	

What Type of Reasoning

Explain	Identify the Error

Reasoning Question – 7.C.8

Used from: NJ Released Questions – 7.C.8 – Equivalent Expressions – M25264

An expression is shown.

$$\frac{5}{6}m + 12 - \frac{2}{3}m - 6$$

A student wrote the steps she used to determine an expression equivalent to the expression shown.

Step 1: $\frac{5}{6}m + 12 - \frac{2}{3}m - 6$

Step 2: $\frac{5}{6}m - \frac{2}{3}m + 12 - 6$

Step 3: $(\frac{5}{6})(-\frac{2}{3})m + 12 - 6$

Step 4: $-\frac{10}{18}m + 6$

- In which step did the student make her first error?
- Explain your response.
- Write the correct expression for this step.
- Explain your response.

Enter your answers and your explanations in the space provided.