What Are My Chances?

Lesson Overview

In this lesson, students will rotate through math stations and play games of chance to collect data. They will use the data to compare theoretical and experimental probability of simple events.

Alignment

Standard/Indicator Addressed

SCCCR Math 7.DSP.5 Investigate the concept of probability of chance events.

a. Determine the probabilities of simple events.
b. Understand that probability measures the likelihood of a chance event occurring.
c. Understand that the probability of a chance event is a number between 0 and 1.
d. Understand that a probability closer to 1 indicates a likely chance event.
e. Understand that a probability close to ½ indicates that a chance event is neither likely nor unlikely.
f. Understand that a probability closer to 0 indicates an unlikely chance event.

SCCCR Math 7.DSP.6 Investigate the relationship between theoretical and experimental probabilities for simple events.

a. Determine the approximate outcomes using theoretical probability.
b. Perform experiments that model theoretical probability.
c. Compare theoretical and experimental probabilities.

Standards for Mathematical Practice (as appropriate)

Standard 1: Make sense of problems and persevere in solving them.

a. Relate a problem to prior knowledge.
b. Recognize there may be multiple entry points to a problem and more than one path to a solution.

Standard 2: Reason both contextually and abstractly.

a. Make sense of quantities and their relationships in mathematical and real-world situations.

Standard 3: Use critical thinking skills to justify mathematical reasoning and critique the reasoning of others.

a. Construct and justify a solution to a problem.
b. Compare and discuss the validity of various reasoning strategies.
c. Make conjectures and explore their validity.
d. Reflect on and provide thoughtful responses to the reasoning of others.

Standard 6: Communicate mathematically and approach mathematical situations with precision.

a. Express numerical answers with the degree of precision appropriate for the context of a situation.
b. Represent numbers in an appropriate form according to the context of the situation.
c. Use appropriate and precise mathematical language

Science and Engineering Practices (as appropriate)

S.1A.4: Analyze and interpret data.

S.1A.5: Use mathematics and computational thinking.

S.1A.6: Construct explanations.

S.1A.8: Obtain, evaluate, and communicate information.

ELA Inquiry Standards (as appropriate)

**Don't think there were any that were a good fit.

Connections

Active Learning Strategies (for Purposeful Reading, Meaningful Writing, and Productive Dialogue)

Graphic Organizers
Popsicle Sticks

Content Area (2 or more) Connections

This lesson is in the context of the Probability and Genetics Unit. No other specific content standards are cited in this lesson.

Lesson Plan

Time Required – Two 60-minute class periods

Disciplinary Vocabulary – random, chance(s), probability, ratio, percentage, likelihood (unlikely, neither likely nor unlikely, likely), outcomes, simple event, theoretical probability, experimental probability

NOTE: The Engage and station tasks are designed to provide context for the students to develop definitions for and understanding of the vocabulary.

Materials Needed:

- 10 color tiles: 1 yellow, 2 blue, 3 green, and 4 red
- masking tape
- post-it notes with the probabilities for the color tiles (EX: If you have 30 desks, the probability of there being a yellow tile is 1/30; blue tile: 2/30 or 1/15; etc.)
- Engage slides (included)
- popsicle sticks with student names

For each Coin Toss station:

- coin
- Coin Toss graphic organizer for each student (1/2 sheet – included)

For each Prime or Composite station:

- one 6-sided die
- Prime or Composite graphic organizer for each student (1/2 sheet – included)

For each Pick a Face Card station:

- regular deck of playing cards with the Jokers removed
- Pick a Face Card graphic organizer for each student (1/2 sheet – included)

For each Pick a Suit station:

- regular deck of playing cards with the Jokers removed
- Pick a Suit graphic organizer for each student (1/2 sheet – included)

For each Odd or Even station:

- The 1 – 9 cards from a deck of Uno cards (just 2 colors)
- Pick a Number graphic organizer for each student (1/2 sheet – included)

Formative Assessment Strategies: Student dialogue, Game Summary handouts, Exit Ticket

Computational Thinking:

- **Logically organizing and analyzing data:** Students use their graphic organizers to collect data from playing the games of chance. They use that data to explore theoretical and experimental probability.
- **Representing data through abstractions such as models and simulations:** The games of chance serve as simulations of simple events to help students develop understanding of theoretical and experimental probability of simple events, as well as compare theoretical and experimental probability.
- **Confidence in dealing with complexity:** While the simulations in this lesson are examples of simple probability, this is the first time students formally encounter these concepts. They must use prior experience with games in concert with the simulations to help establish a foundation for better mathematical understanding.
- **Persistence in working with difficult problems:** Many students struggle with using fractions, ratios, and percentages. This lesson provides the context and opportunity for students to review and refine those skills.
- **The ability to communicate and work with others to achieve a common goal or solution:** Students must work together as partners and in small groups to complete the tasks at the stations and later, combine their data for a whole class snapshot of the results of the games.

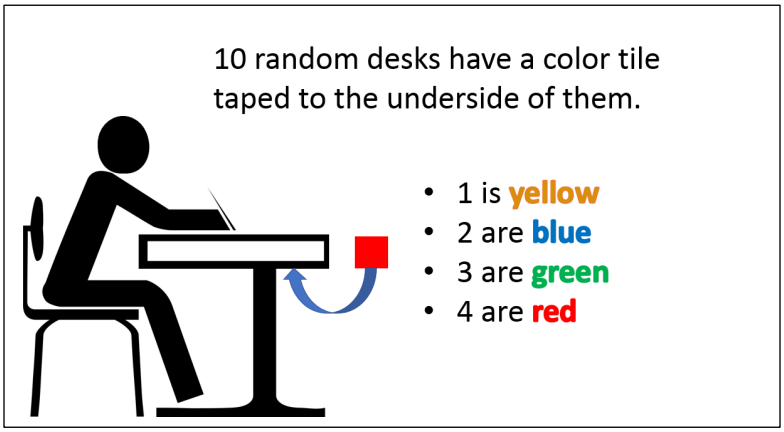
Misconceptions:

- When a probability experiment has very few attempts or outcomes, the result can be deceptive. Computer simulations may help students avoid or overcome erroneous probabilistic thinking. Simulations afford students access to relatively large samples that can be generated quickly and modified easily. Using large samples, the distribution is more likely to be close to the actual distribution. When simulations are used, you will need to help students understand what the simulation data represent and how they relate to the problem situation.
- Students may confuse what has happened with what may happen.
- Students may believe that because an event has recently happened it has a high probability of reoccurring.
- Students may use too small a sample size when using experimental relative observed frequencies as a measure of probability.
- Students may make the assumption that outcomes are equally likely (in order to

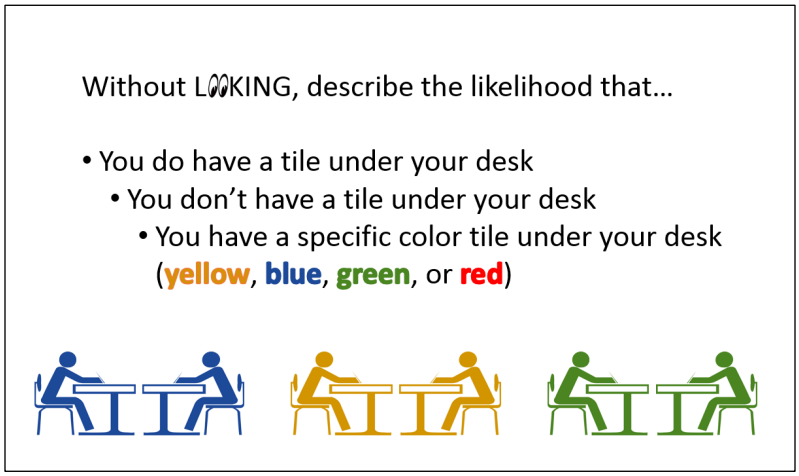
calculate theoretical probabilities) when they are not.

Engage

- Before class, tape 1 yellow, 2 blue, 3 green, and 4 red tiles to the undersides of 10 desks.
- After students are seated, display the following slide:



- Ask students if they have any questions about what's on the slide.
- Explain to students they'll be working with their partners to accomplish the task on the next slide:

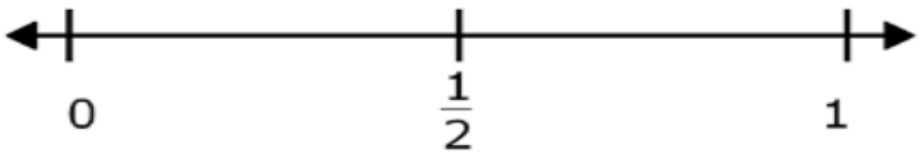


- Circulate as students work to ask guiding questions and check progress. Use the vocabulary associated with probability. Some possible questions:
    - How many total desks are in the room?
    - There are 4 red color tiles. How likely is it that you have one of them under your desk? Craft similar questions for the other colors.
    - How can you describe the chances that you have or don't have a tile?

- When students have had time to work and talk, bring them back together for whole group dialogue. Begin by asking students to check under their desks to see if they have one of the tiles.
- Ask: "What were all the possible outcomes for having a tile under your desk?"
    - 1 yellow, 2 blue, 3 green, 4 red
    - The term for all possible outcomes is sample space.
- Other points to make:
    - Terms: random, chances, probability, ratio, percentage, likelihood (unlikely, neither likely nor unlikely, likely), simple event, theoretical probability, experimental probability
    - Establish the probability for each of the colors.
    - Establish the probability for any of the tiles.
    - Establish the probability for combinations of the tiles.
    - Establish the probability of NOT having a tile at all.

NOTE: Write each of the probabilities on the board as fractions in simplest form.

- Draw a number line on the board and tell students to draw one in their math notebooks.



- Tell students to work with their partners to place the fractions describing the tile probabilities on the number line.
- Distribute the post-it notes with the tile probabilities written on them and have students place the post-its on the number line. These post-its should be prepared ahead of time.
- Lead a discussion of the placement of the post-it notes and clarify use of the terms *unlikely, neither likely nor unlikely,* and *likely.*
- Ask students to tape the tiles back under the desks for the next class.

Explore

General instructions for math stations / probability games:

- Explain to students there are 5 math stations. Each station has an activity they'll use to explore probability.
- Students need to take their math notebooks and a pencil with them to each station.
- At each station, there is a handout with specific directions for each game and a table for collecting data for that game. Students should take one of the handouts to record their

work. The handouts are intended to be ½ sheets that can be taped or glued into students' math notebooks. You may also run the handouts as full sheets with white space at the bottom for use in the Explain portion of the lesson.

- Students will spend between 5 and 7 minutes at each station and will rotate through all stations, playing the games and collecting data.
- Circulate as students work to ask guiding questions and check progress.

Math Stations / Probability Games

- **Flip a Coin**

  Predict what you think will be the most frequent outcome when you flip the coin. Then run the experiment 20 times. For each trial, record the actual outcome in the RESULT row. If the result matches your predicted outcome, put a check mark in the PREDICTION row.

  Prediction for most frequent outcome: HEADS TAILS

TRIAL	1	2	3	4	5	6	7	8	9	10
RESULT										
PREDICTION										

TRIAL	11	12	13	14	15	16	17	18	19	20
RESULT										
PREDICTION										

- **Prime or Composite?**

  Predict what you think will be the most frequent outcome when you roll 1 die labeled with numbers 1-6. Then run the experiment 20 times. For each trial, record the actual outcome in the RESULT row. If the result matches your predicted outcome, put a check mark in the PREDICTION row.

  Prediction for most frequent outcome: PRIME COMPOSITE NEITHER

TRIAL	1	2	3	4	5	6	7	8	9	10
RESULT										
PREDICTION										

TRIAL	11	12	13	14	15	16	17	18	19	20
RESULT										
PREDICTION										

- **Pick a Card Face**

  Shuffle the deck of playing cards. Predict what you think will be the most frequent outcome (FACE CARD J, Q, K and Ace **OR** NUMBER CARD 2-10) when you choose a card from the deck. Then run the experiment 20 times, replacing the card you drew and shuffling the deck each time to help ensure a random choice. For each trial, record the actual outcome in the RESULT row. If the result matches your predicted outcome, put a check mark in the PREDICTION row.

  Prediction for most frequent outcome: FACE CARD/ACE NUMBER CARD

TRIAL	1	2	3	4	5	6	7	8	9	10
RESULT										
PREDICTION										

TRIAL	11	12	13	14	15	16	17	18	19	20
RESULT										
PREDICTION										

- **Pick a Suit**

  Shuffle the deck of playing cards. Predict what you think will be the most frequent outcome when you choose a card from the deck. Then run the experiment 20 times, replacing the card you drew and shuffling the deck each time to help ensure a random choice. For each trial, record the actual outcome in the RESULT row. If the result matches your predicted outcome, put a check mark in the PREDICTION row.

  Prediction for most frequent outcome: 

TRIAL	1	2	3	4	5	6	7	8	9	10
RESULT										
PREDICTION										

TRIAL	11	12	13	14	15	16	17	18	19	20
RESULT										
PREDICTION										

- **Odd or Even**

  Shuffle the deck of Uno cards (1s-9s). Predict what you think will be the most frequent outcome (ODD or EVEN) when you choose a card from the deck. Then run the experiment 20 times, returning the card you drew and shuffling the deck each time to help ensure a random choice. For each trial, record the actual outcome in the RESULT row. If the result matches your predicted outcome, put a check mark in the PREDICTION row.

  Prediction for most frequent outcome: ODD EVEN

TRIAL	1	2	3	4	5	6	7	8	9	10
RESULT										
PREDICTION										

TRIAL	11	12	13	14	15	16	17	18	19	20
RESULT										
PREDICTION										

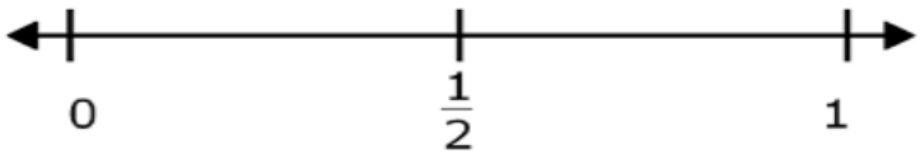
- When students are at the final station, have them check to be sure all materials are there for the next class.
- When students have rotated through all the stations, distribute the Games Summary handout and have partners work together to complete it.
- Partners may join another pair to compare their work.

END DAY 1

BEGINNING OF DAY 2

Explain

- Bring students back together for whole group dialogue to debrief the probability games.
- Come to consensus on the definitions in question 1 on the Games Summary handout. Capture the definitions students provide to create a collective anchor chart.
- Display a blank copy of the Games Summary table.
- Begin with the Coin Toss game. Concentrate on the THEORETICAL PROBABILITY column. Reference the student created definition.
- Use popsicle sticks to randomly choose students to describe how they figured out the theoretical probability. Ask guiding questions and paraphrase responses. Students should make any corrections to the theoretical probability column on their summary.
- Tell students to draw a number line like the one below:



  If students taped/glued their game handouts in their math notebooks, they should draw the number line below the handout. If the handouts are full sheets, they should draw the number line below the table they used to collect data.
- Have students place the ratio for the theoretical probability and the experimental probability on the number line and label each. They should discuss their thinking with their partner.
- Solicit responses to these questions:
  - Is the theoretical probability unlikely, neither likely nor unlikely, or likely? Why do you think this?
  - What about the experimental probability? How did it compare to your theoretical probability? What do you think about this?
- Repeat the process with each of the other games.
- Display a blank copy of the Whole Class Games Summary handout. Collect data from the whole class for the probability of an event matching the predicted event. This works even if different groups predicted different outcomes. Record the number of correctly predicted trials and the experimental probability of each. Since each group performed 20 trials for each game, the number of trials will be 20 x the number of groups.
- Using the data for the Coin Toss game, demonstrate how to figure out the class experimental probability.
- Go through each of the other games, giving students time to work out the class experimental probability. Provide guidance and feedback as students work. Students

should enter the CLASS EXPERIMENTAL PROBABILITY on their Games Summary handout in the last column.

- Distribute the Thinking Questions handout. Students should work with their partners to complete the thinking questions. Collect the handouts as formative assessment.

Exit Ticket:

A jar contains 100 marbles. 30 are red, 20 are black, 5 are green, and the rest are white.

If a marble is randomly pulled from the jar, what is the probability that the marble is:

- red
- black
- green
- white

Place each of these probabilities on a number line.

Do the probabilities you found represent experimental or theoretical probabilities? Explain how you know.

How would you find the other type of probability (experimental or theoretical)?

Why are none of the probabilities greater than one whole? Or less than 0?

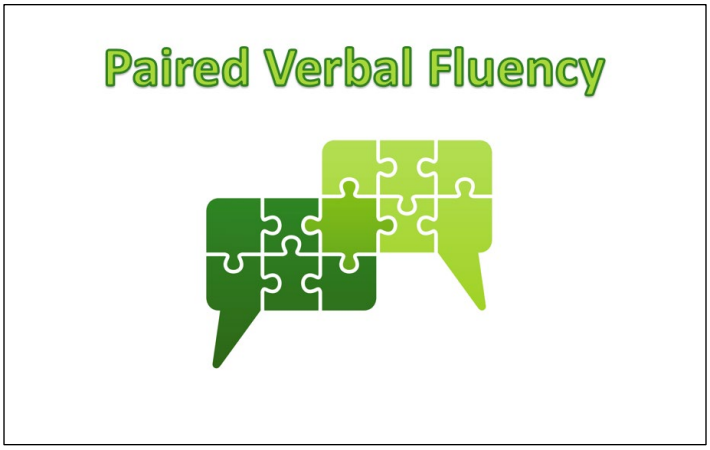
END OF DAY 2

BEGINNING OF DAY 3

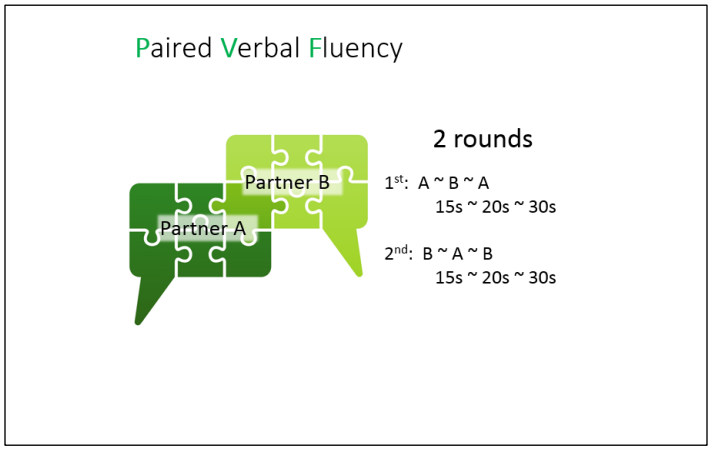
Extend

Fair and Unfair Games

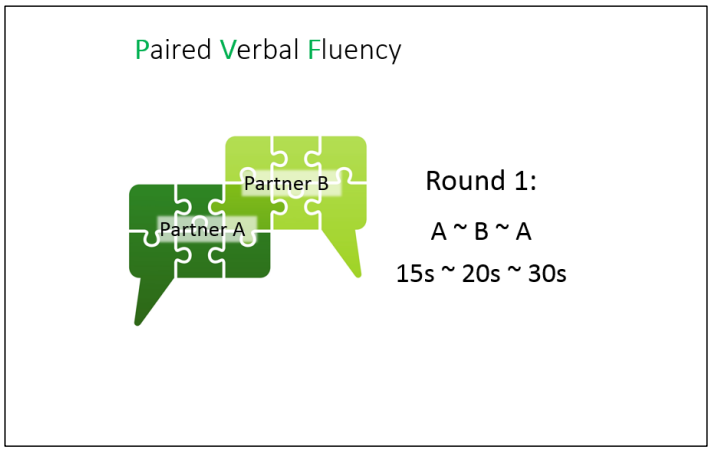
- Use the strategy Paired Verbal Fluency to begin class. This strategy provides structure to support productive dialogue about a given prompt. See handouts included with the lesson for detailed instructions.
- When students are in pairs, display the following slide and explain the strategy:



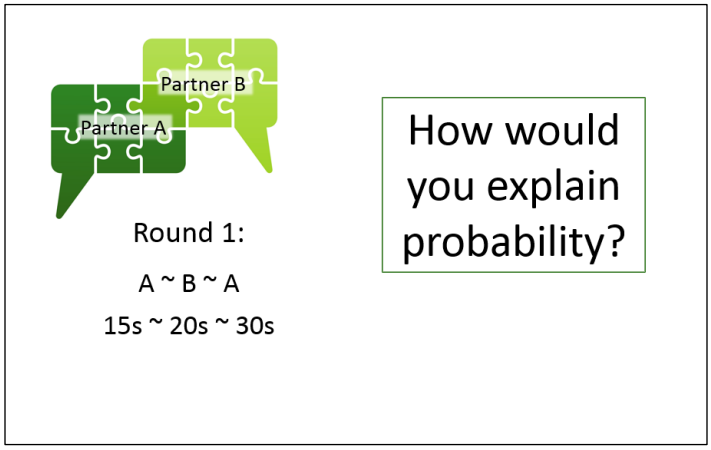
- Then display the slide below. It explains that there will be two rounds of dialogue. In the first round, Partner A speaks first and last, with Partner B speaking in between. In the second round, Partner B speaks first and last, with Partner A speaking in between. The partners take turns speaking for the times indicated.



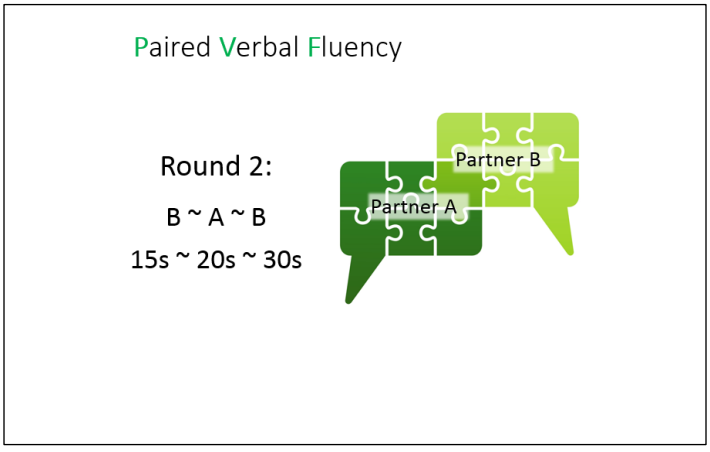
- Then this slide. It reinforces the structure of Round 1.



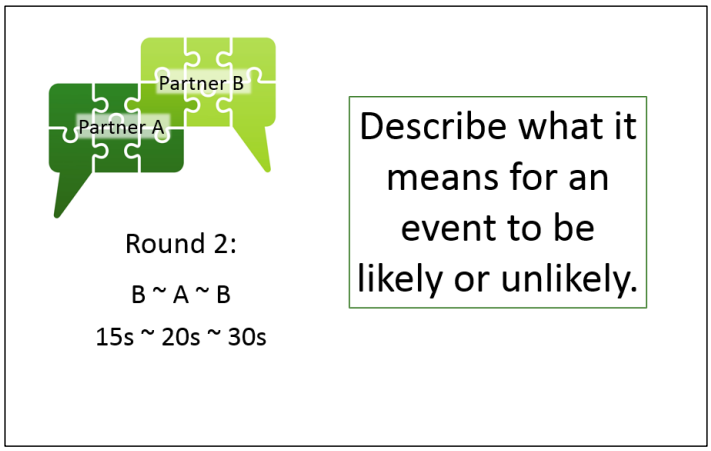
- Then this slide. It has the prompt students will use for Round 1.



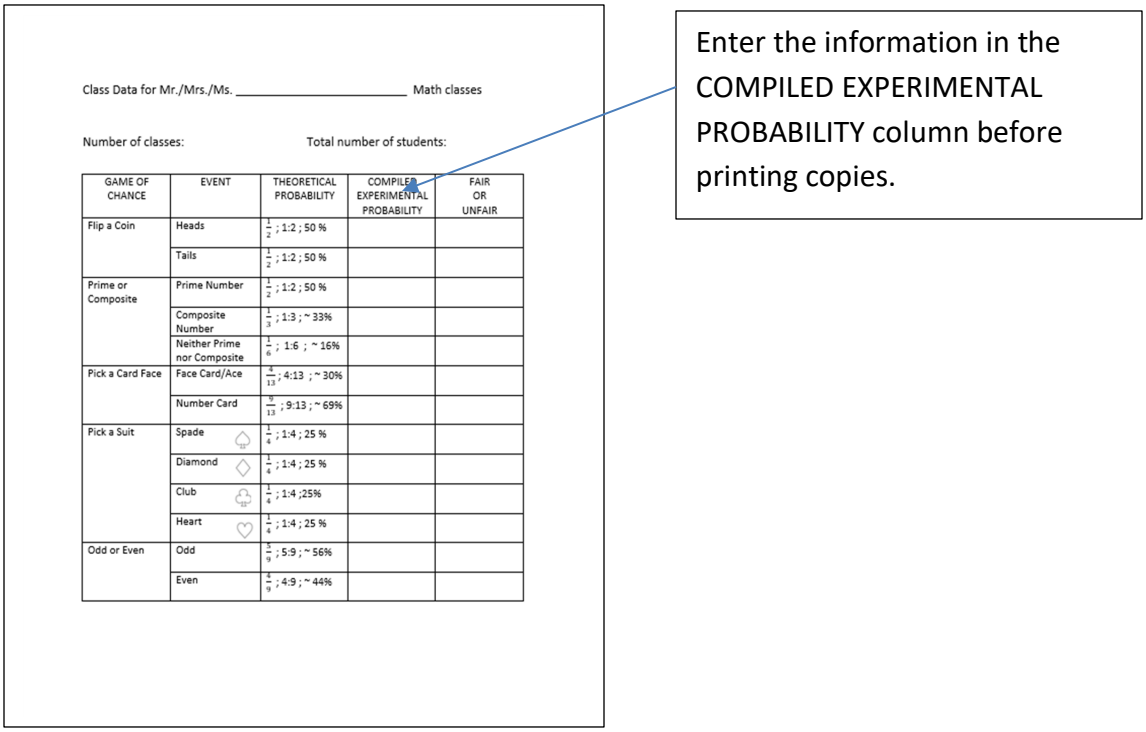
- Then this slide. It reinforces the structure of Round 2.



- Then this slide. It has the prompt students will use for Round 2.



- When both rounds are completed, solicit thoughts about the prompts from the students.
- Share the compiled experimental probabilities for the games with students.
- Tell students they will be looking at each of the games from the previous day in order to decide whether they are fair or unfair.
- Distribute the Fair or Unfair? handout as well as the one with the compiled data for all the classes you teach.



Class Data for Mr./Mrs./Ms. _____ Math classes

Number of classes: Total number of students:

GAME OF CHANCE	EVENT	THEORETICAL PROBABILITY	COMPILED EXPERIMENTAL PROBABILITY	FAIR OR UNFAIR
Flip a Coin	Heads	$\frac{1}{2}$; 1:2 ; 50 %		
	Tails	$\frac{1}{2}$; 1:2 ; 50 %		
Prime or Composite	Prime Number	$\frac{1}{2}$; 1:2 ; 50 %		
	Composite Number	$\frac{1}{3}$; 1:3 ; ~ 33%		
	Neither Prime nor Composite	$\frac{1}{6}$; 1:6 ; ~ 16%		
Pick a Card Face	Face Card/Ace	$\frac{4}{13}$; 4:13 ; ~ 30%		
	Number Card	$\frac{9}{13}$; 9:13 ; ~ 69%		
Pick a Suit	Spade	$\frac{1}{4}$; 1:4 ; 25 %		
	Diamond	$\frac{1}{4}$; 1:4 ; 25 %		
	Club	$\frac{1}{4}$; 1:4 ;25%		
	Heart	$\frac{1}{4}$; 1:4 ; 25 %		
Odd or Even	Odd	$\frac{5}{9}$; 5:9 ; ~ 56%		
	Even	$\frac{4}{9}$; 4:9 ; ~ 44%		

- Students work in pairs to decide whether each game is fair or unfair. Students should record their decisions in the last column on the compiled data sheet.
- Have pairs form groups of four to compare their work.
- Circulate as students work to ask guiding questions and check progress.
- Assign one game to each small group of 4 (some groups may have the same game).
- Have students use the strategy Making Thinking Visible to explain whether their game is fair or unfair. If they decided the game is unfair, have them include a change they might make to the game so that it would be fair. Making Thinking Visible is a strategy where students use a combination of pictures and words to communicate their thinking. Students may use poster paper or 11 x 17 paper for their work.
- Students display their posters and participate in a Gallery Walk to examine each other's' work.

Exit Ticket:

Quick Write: Describe how the games of chance you played and studied help you better understand probability. Use as much math vocabulary as you can.

Fair or Unfair?

What does it mean for a game to be fair?

Flip a Coin

Flipping HEADS means a win for Partner A. Flipping TAILS means a win for Partner B. Is this FAIR or UNFAIR? Why?

Prime or Composite?

Rolling a PRIME number means a win for Partner A, and rolling a COMPOSITE number means a win for Partner B. Is this FAIR or UNFAIR? Why?

Pick a Card Face

Picking a FACE CARD (J, Q, K, or Ace) means a win for Partner A. Picking a number card (2-10) means a win for Partner B. Is this FAIR or UNFAIR? Why?

Pick a Suit

Picking any  or  means a win for Partner A. Picking any  or  means a win for Partner B. Is this FAIR or UNFAIR? Why?

Odd or Even

Picking an ODD card means a win for Partner A. Picking an EVEN card means a win for Partner B. Is this FAIR or UNFAIR? Why?

Now, consider the games you decided were UNFAIR. What might change about each one to make it FAIR? Explain your changes.

Class Data for Mr./Mrs./Ms. _____ Math classes

Number of classes: Total number of students:

GAME OF CHANCE	EVENT	THEORETICAL PROBABILITY	COMPILED EXPERIMENTAL PROBABILITY	FAIR OR UNFAIR
Flip a Coin	Heads	$\frac{1}{2}$; 1:2 ; 50 %		
	Tails	$\frac{1}{2}$; 1:2 ; 50 %		
Prime or Composite	Prime Number	$\frac{1}{2}$; 1:2 ; 50 %		
	Composite Number	$\frac{1}{3}$; 1:3 ; ~ 33%		
	Neither Prime nor Composite	$\frac{1}{6}$; 1:6 ; ~ 16%		
Pick a Card Face	Face Card/Ace	$\frac{4}{13}$; 4:13 ; ~ 30%		
	Number Card	$\frac{9}{13}$; 9:13 ; ~ 69%		
Pick a Suit	Spade 	$\frac{1}{4}$; 1:4 ; 25 %		
	Diamond 	$\frac{1}{4}$; 1:4 ; 25 %		
	Club 	$\frac{1}{4}$; 1:4 ;25%		
	Heart 	$\frac{1}{4}$; 1:4 ; 25 %		
Odd or Even	Odd	$\frac{5}{9}$; 5:9 ; ~ 56%		
	Even	$\frac{4}{9}$; 4:9 ; ~ 44%		

Flip a Coin

Materials: 2 coins

Predict what you think will be the most frequent outcome when you flip the coin. Then run the experiment 20 times. For each trial, record the actual outcome in the RESULT row. If the result matches your predicted outcome, put a check mark in the PREDICTION row.

Prediction for most frequent outcome: HEADS TAILS

TRIAL	1	2	3	4	5	6	7	8	9	10
RESULT										
PREDICTION										

TRIAL	11	12	13	14	15	16	17	18	19	20
RESULT										
PREDICTION										

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Materials: 2 coins

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Prediction for most frequent outcome: HEADS TAILS

TRIAL	1	2	3	4	5	6	7	8	9	10
RESULT										
PREDICTION										

TRIAL	11	12	13	14	15	16	17	18	19	20
RESULT										
PREDICTION										

Prime or Composite

Materials: one 6-sided die

Predict what you think will be the most frequent outcome when you roll 1 die labeled with numbers 1-6. Then run the experiment 20 times. For each trial, record the actual outcome in the RESULT row. If the result matches your predicted outcome, put a check mark in the PREDICTION row.

Prediction for most frequent outcome: PRIME COMPOSITE NEITHER

TRIAL	1	2	3	4	5	6	7	8	9	10
RESULT										
PREDICTION										

TRIAL	11	12	13	14	15	16	17	18	19	20
RESULT										
PREDICTION										

Prime or Composite

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Prediction for most frequent outcome: PRIME COMPOSITE NEITHER

TRIAL	1	2	3	4	5	6	7	8	9	10
RESULT										
PREDICTION										

TRIAL	11	12	13	14	15	16	17	18	19	20
RESULT										
PREDICTION										

Pick a Card Face

Materials: one deck of 52 cards

Shuffle the deck of playing cards. Predict what you think will be the most frequent outcome (Face Card J, Q, K and Ace **OR** Number Card 2-10) when you choose a card from the deck. Then run the experiment 20 times, replacing the card you drew and shuffling the deck each time to help ensure a random choice. For each trial, record the actual outcome in the RESULT row. If the result matches your predicted outcome, put a check mark in the PREDICTION row.

Prediction for most frequent outcome: FACE CARD/ACE NUMBER CARD

TRIAL	1	2	3	4	5	6	7	8	9	10
RESULT										
PREDICTION										

TRIAL	11	12	13	14	15	16	17	18	19	20
RESULT										
PREDICTION										

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Prediction for most frequent outcome: FACE CARD/ACE NUMBER CARD

TRIAL	1	2	3	4	5	6	7	8	9	10
RESULT										
PREDICTION										

TRIAL	11	12	13	14	15	16	17	18	19	20
RESULT										
PREDICTION										

Pick a Suit

Materials: one deck of 52 cards

Shuffle the deck of playing cards. Predict what you think will be the most frequent outcome when you choose a card from the deck. Then run the experiment 20 times, replacing the card you drew and shuffling the deck each time to help ensure a random choice. For each trial, record the actual outcome in the RESULT row. If the result matches your predicted outcome, put a check mark in the PREDICTION row.

Prediction for most frequent outcome: 

TRIAL	1	2	3	4	5	6	7	8	9	10
RESULT										
PREDICTION										

TRIAL	11	12	13	14	15	16	17	18	19	20
RESULT										
PREDICTION										

Pick a Suit

Materials: one deck of 52 cards

Shuffle the deck of playing cards. Predict what you think will be the most frequent outcome when you choose a card from the deck. Then run the experiment 20 times, replacing the card you drew and shuffling the deck each time to help ensure a random choice. For each trial, record the actual outcome in the RESULT row. If the result matches your predicted outcome, put a check mark in the PREDICTION row.

Prediction for most frequent outcome: 

TRIAL	1	2	3	4	5	6	7	8	9	10
RESULT										
PREDICTION										

TRIAL	11	12	13	14	15	16	17	18	19	20
RESULT										
PREDICTION										

Odd or Even

Materials: 18 cards; 1-9 of one color and 1-9 of a second color

Shuffle the deck of Uno cards (1s – 9s). Predict what you think will be the most frequent outcome (ODD or EVEN) when you choose a card from the deck. Then run the experiment 20 times, returning the card you drew and shuffling the deck each time to help ensure a random choice. For each trial, record the actual outcome in the RESULT row. If the result matches your predicted outcome, put a check mark in the PREDICTION row.

Prediction for most frequent outcome: ODD EVEN

TRIAL	1	2	3	4	5	6	7	8	9	10
RESULT										
PREDICTION										

TRIAL	11	12	13	14	15	16	17	18	19	20
RESULT										
PREDICTION										

Odd or Even

Materials: 18 cards; 1-9 of one color and 1-9 of a second color

Shuffle the deck of Uno cards. Predict what you think will be the most frequent outcome when you choose a card from the deck. Then run the experiment 20 times, returning the card you drew and shuffling the deck each time to help ensure a random choice. For each trial, record the actual outcome in the RESULT row. If the result matches your predicted outcome, put a check mark in the PREDICTION row.

Prediction for most frequent outcome:

TRIAL	1	2	3	4	5	6	7	8	9	10
RESULT										
PREDICTION										

TRIAL	11	12	13	14	15	16	17	18	19	20
RESULT										
PREDICTION										

Games Summary

Use the data you collected while playing the probability games to complete the table below.

GAME OF CHANCE	EVENT	THEORETICAL PROBABILITY (chances of event)	EXPERIMENTAL PROBABILITY (What actually happened)	CLASS EXPERIMENTAL PROBABILITY (save for later)
Flip a Coin	Heads			
	Tails			
Prime or Composite	Prime Number			
	Composite Number			
	Neither Prime nor Composite			
Pick a Card Face	Face Card/Ace			
	Number Card			
Pick a Suit	Spade 			
	Diamond 			
	Club 			
	Heart 			
Odd or Even	Odd			
	Even			

1. In your own words, define each of the terms:
    a. event
    b. random
    c. theoretical probability
    d. experimental probability

2. In which game were your predictions most accurate? How close were you to the theoretical probability for that game?

3. Why do you think probabilities are never less than zero or greater than 1?

Whole Class Games Summary

GAME OF CHANCE	NUMBER OF **CORRECT** PREDICTIONS	CLASS EXPERIMENTAL PROBABILITY
Flip a Coin		
Prime or Composite?		
Pick a Card Face		
Pick a Suit		
Odd or Even		

Thinking Questions

Use your Games Summary handout to answer the questions. Choose at least 2 games.

1. Compare the theoretical probability, your personal experimental probability, and the class experimental probability.

GAME	THEORETICAL PROBABILITY	PERSONAL EXPERIMENTAL PROBABILITY	CLASS EXPERIMENTAL PROBABILITY
Describe what you notice.			
GAME	THEORETICAL PROBABILITY	PERSONAL EXPERIMENTAL PROBABILITY	CLASS EXPERIMENTAL PROBABILITY
Describe what you notice.			

2. Describe what you think would happen if you continued to perform trials in these games.