Introduction
Title: Probability and Statistics

Grade Level: 4th Grade

Target Group: mainstream class with integrated ELL students

Source of Lessons:

Source of written reading materials:


Learning Goals:

1) I want my students to know whether an outcome is certain, more likely, equally likely, less likely or impossible.
2) I want my students to know how to determine the probability of an event.
3) I want my students to solve real-world problems involving probability.
Lesson 1
### Probability & Stats: Chapter 5.4 Outcomes - Lesson 1

**Content Objectives**

Students will be able to analyze a math based visual and express the likelihood of a specific predicted outcome by using probability terms.

**Language Objectives**

In pairs, students will:

a) Read a worksheet
b) Discuss the likeliness of an outcome using probability vocabulary
c) Write the likeliness of an outcome using probability vocabulary

<table>
<thead>
<tr>
<th>Domain/Topic</th>
<th>Fluent Bridging Level 5</th>
<th>Expanding Fluency Level 4</th>
<th>Speech Emerging Level 3</th>
<th>Early Production Level 2</th>
<th>Preproduction Level 1</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Reading: Reading a worksheet</strong></td>
<td>Students will silently read the probability word problems, being able to orally express the important information needed to answer the problem in full sentences.</td>
<td>Students will read aloud the probability word problem, being able to orally express the important information needed to answer the problem in short phrases.</td>
<td>Students will chorally read aloud the probability word problem, underlining the important information needed to answer the problem.</td>
<td>Students will read aloud, by repeating me, the probability word problem. Students will label the picture representation to answer the problem.</td>
<td>Students will use a picture problem and label the important information needed to solve a problem through a probability picture.</td>
</tr>
<tr>
<td><strong>Speaking: Prediction of an outcome</strong></td>
<td>In pairs, students will express the likeliness of an outcome, using probability terms by leading discussion of the probability problems.</td>
<td>Students will express the likeliness of an outcome, using probability terms by fully participating in a discussion of the probability problem.</td>
<td>Students will express the likeliness of an outcome, using probability terms in group discussion of the probability problem with vocabulary cards and sentence starters.</td>
<td>Students will express the likeliness of an outcome, using probability terms in group discussion using 1-2 word phrases with the aid of with vocabulary cards.</td>
<td>Students will express the likeliness of an outcome, using probability terms in pointing to the correct probability vocabulary cards.</td>
</tr>
<tr>
<td><strong>Writing: the likelihood of a specific outcome</strong></td>
<td>Students will write their answers and explanations to the probability problems in a short paragraph.</td>
<td>Students will write their answer and explanations to the probability problem in 2-3 sentences.</td>
<td>Students will write their answer and explanations to the probability problem in 2-3 sentences using sentence starters.</td>
<td>Students will write their answer and explanations to the probability problem using a fill in the blank/word bank answer frames.</td>
<td>Students will answer the probability problem by circling the probability vocabulary that matches the picture problem. Students will then copy and the words they have circled.</td>
</tr>
<tr>
<td>Function</td>
<td>Situation</td>
<td>Expression</td>
<td>Words</td>
<td>Grammar</td>
<td></td>
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<tr>
<td>--------------------------</td>
<td>---------------------------------------------</td>
<td>---------------------------------------------------------------------------</td>
<td>-----------------------------------------------------------------------</td>
<td>------------------</td>
<td></td>
</tr>
<tr>
<td>Identifying and Predicting</td>
<td>Make a prediction of given situation occurring.</td>
<td>The outcome is __________.</td>
<td>1) Certain, unlikely Likely, impossible, equally likely</td>
<td>Adjectives Adverbs Comparison (more /less)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>I predict __________ is the __________ outcome.</td>
<td>2) red, orange, purple, blue, green, white, black, brown</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>The likeliness of __________ as the outcome is __________.</td>
<td>3) less likely, more likely, certain</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Justifying</td>
<td>Explain predictions thinking.</td>
<td>__________ will (not) be the outcome because there are __________ of that color cubes.</td>
<td>1) red, orange, purple, blue green, white, black, brown</td>
<td>Adjectives Descriptions</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>2) more, less, equal/same amounts, none, only that color</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Chapter 5.4 Outcomes - Lesson 1 Day 1

Materials:
6 square poster - Outcome
Experiments/Events and Outcomes T Chart Poster
6 pictures
tape
Modified Texts
Colored cubes or chips
Plastic sandwich bags
Small whiteboard
Whiteboard markers
Answer frames on sentence strips - see function chart
Index cards

Building Background Knowledge -15 Minutes

1. Gather students as a group on the rug.
2. Show students a sentence strip with the word “outcome” on it.
   Have students repeat the word after you.
3. Show the students the completed 6 square poster. Go through
   the poster with them. This can also be copied for a page for
   their notebooks. pg 8
4. Show students the Experiment/Event and Outcome T-chart,
   found on page 9. Take the 6 pictures, found on pages 10-12,
   and tape them to the board.
5. Say: “I have 6 pictures. These pictures can be paired up. One is
   the experiment or event and the other is the outcome. Turn and
   talk with a friend and see if you can figure out which pictures are
   pairs and if they are an event or outcome.”
6. Students turn and talk with friends, in the L1 or L2, and discuss
   for about 2 minutes.
7. Say: “Who would like to come up and place a pair in our T-chart?”
   Students come up and place the pictures in the chart as follows:
<table>
<thead>
<tr>
<th>Experiments or Events</th>
<th>Outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td>man falling on a bike</td>
<td>Cast wrist</td>
</tr>
<tr>
<td>Watering a plant</td>
<td>Flower</td>
</tr>
<tr>
<td>Fire on a stove</td>
<td>House burning with firemen</td>
</tr>
</tbody>
</table>

8. As each person comes up and puts the pictures in the T-Chart ask: “How did you get this answer?” Students should respond: “Because first ________________ happened then ________________ happened.” Or something similar.

Vocabulary and Modified Text - 15 minutes

9. Review the lesson objectives with students. Say, “Today we are going to be working on:

**Content Objectives:** to analyze a math based visual and express the likelihood of a specific predicted outcome by using probability terms

**Language Objectives:** In pairs, students will 1) Read a worksheet, 2) discuss the likeliness of an outcome using probability vocabulary, and 3) write the likeliness of an outcome using probability vocabulary.

10. Pass out Texts - See modified texts on pages 13-15 - be sure to pass out the appropriate sheets to the specific levels of language ability.

11. Partners read texts. Pull the group of Language Level 1 & 2 students and read it with them.

12. Introduce the following vocabulary words whole group reviewing the main points of what they read. Says, “the experiment or event we will be doing is pulling cubes out of a bag. I want to pull out a blue cube.”
13. **Model:** "What do they notice about the cubes?"
Have students turn and talk, in their L1 or L2, about this question and then share out ideas with the whole class.

**Teacher models how to use answer frames:**
- Impossible has no blue cubes.
- If an event is certain it has all blue clubs.
- When there are 3 blue cubes and 2 yellows it is most likely because there are more blues than yellows.

**Students Language Level 1-3 - Students should get these phrases from answer frames provided on sentences strips. See function charts for answer frames.**

**Practice/Activities - 20 minutes -> in pairs**

14. Have students return to their seats.

15. Pass out plastic bags and multiple cubes or chips to pairs of students.

16. Say: "With your partner, you are going to build a bag that shows the different outcome vocabulary I write on my white board."

Examples to write on small whiteboard and show students:
- red is certain
- blue is impossible
- yellow is more likely
- green is less likely
- orange and black are equally likely

17. Be sure to give them an example before letting them do this on their own.

18. Allow students to use their modified texts to help them.
19. After each one example as a group to share out, Ask: "How does each your bag show ____________________?"

Students should respond with phrases such as:
- Because there are all red chips.
- Blue has 2 chips but yellow has 5 chips. There are more yellow then blue.

Students Language Level 1-3 - Students should get these phrases from answer frames provided on sentences strips. See function charts for answer frames. pg. 3

Closure - 10 minutes
20. Say: "You are now creating your own bag with your partner. You get to choose what outcome vocabulary and color you use." After you are done creating your bag. Write down the color this question on an index card: 'What is the likeliness of getting a ____________ chip?" Write question on board. "You will put the color you choose in the blank. On the back of the card write down the answer to your question."

21. Explicitly model this entire process with the question "What is the likeliness of getting a green chip?" Answer: More likely.

22. Give pairs of students 5 minutes to complete the task. Remind them not to share it with another group. After each group is done, have them stand on the rug next to their partner with their bag and index card.

23. Now have pairs of students share their bags and read the question out loud to another pair of students. The 2nd pair is to guess the answer to their question and explain why they think that. Then have the 2nd pair of students share their bag and do the process again.

24. After each pair has shared, answered, and explained, ask: "What is one new thing you learned today?" Have students turn and talk.
<table>
<thead>
<tr>
<th>Picture:</th>
<th>What do you think of?</th>
<th>At the end</th>
<th>What it is not:</th>
<th>The start</th>
</tr>
</thead>
<tbody>
<tr>
<td>Word:</td>
<td>In your own words (clue):</td>
<td></td>
<td>Definition:</td>
<td></td>
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<tr>
<td></td>
<td>What happens after you do something</td>
<td></td>
<td>The result of an experiment or event</td>
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<tr>
<td>Outcome</td>
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</tr>
<tr>
<td>Experiment or Event</td>
<td>Outcome</td>
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</tbody>
</table>
Lesson Objective

- Decide whether an outcome is certain, more likely, equally likely, less likely, or impossible.

Vocabulary

<table>
<thead>
<tr>
<th>outcome</th>
<th>equally likely</th>
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<tbody>
<tr>
<td>certain</td>
<td>less likely</td>
</tr>
<tr>
<td>more likely</td>
<td>impossible</td>
</tr>
</tbody>
</table>

Learn

Use data to predict if a result is more likely or less likely.

A bag contains 7 blue marbles and 2 yellow marbles.

When a marble is drawn from the bag, the result is called an outcome.

If a blue marble is drawn, the outcome is a blue marble. If a yellow marble is drawn, the outcome is a yellow marble.

Only a blue or a yellow marble can be drawn from the bag. So there are only two possible outcomes.

Since there are more blue marbles than yellow marbles, you are more likely to pick a blue marble than a yellow marble.

Because there are only two yellow marbles, you are less likely to pick a yellow marble.
Use data to predict if a result is certain or impossible.

2 yellow marbles are removed from the bag.

Since there are only blue marbles left in the bag, it is certain that a blue marble will be drawn.

Since there are no yellow marbles left in the bag, it is impossible to pick a yellow marble.

Use data to predict if two results are equally likely to occur.

The bag contains 5 blue marbles and 5 yellow marbles.

The number of blue marbles is the same as the number of yellow marbles.

Since there are an equal number of blue and yellow marbles, it is equally likely that the outcome will be a blue marble or a yellow marble.
Chapter 5.4 Outcomes
Language Levels 1-3

When pulling a cube out of the bag, what is the likelihood of the cube being blue?

<table>
<thead>
<tr>
<th>Outcome Vocabulary</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Equally likely</td>
<td><img src="image1" alt="Blue Cubes" /></td>
</tr>
<tr>
<td>Less likely</td>
<td><img src="image2" alt="Blue and Orange Cubes" /></td>
</tr>
<tr>
<td>Impossible</td>
<td><img src="image3" alt="Orange Cubes" /></td>
</tr>
<tr>
<td>Certain</td>
<td><img src="image1" alt="Blue Cubes" /></td>
</tr>
<tr>
<td>More likely</td>
<td><img src="image2" alt="Blue and Orange Cubes" /></td>
</tr>
</tbody>
</table>
Chapter 5.4 Outcomes - Lesson 1 Day 2

Materials:
Modified Texts from Day 1
Model Spinners
Chart Paper
Markers
Bags with cubes/chips with 10 red, 5 yellow, 15 blue- per pair
Game Worksheets
Blank Spinners
Cards with 1 outcome vocabulary on it for each child.
Crayons
Answer frames on sentence strips - see function chart from day 1

Review - 15 minutes

1. Meet students on the rug whole group.
2. Review the lesson objectives with students. Say, "Today we are going to be working on:
   Content Objectives: analyze a math based visual and express the likelihood of a specific predicted outcome by using probability terms
   Language Objectives: In pairs, students will 1) Read a worksheet, 2) discuss the likeliness of an outcome using probability vocabulary, and 3) write the likeliness of an outcome using probability vocabulary.
3. Show students a spinner, on page 19. Tape spinner to a chart paper.
4. Say, "If I were to spin this spinner, what are the possible outcomes that the arrow with land on?"
   Students Turn and Talk and Share Out
   Students will state: red, green, blue, yellow
   Record their answers on chart paper
5. Ask: "What is the likelihood of spinning _______?"
   Color
   Also add a non-sense color - like purple in.
Ask pulling a green or blue. 
Students Turn and Talk - using L1 or L2 
Students will respond: 
Red - likely 
Yellow-less likely 
Green - less likely 
Blue - less likely 
Purple - impossible 
Green or blue - equally likely 
Allow students to use their modified texts as support if needed.

6. Model for students how to use answer frame. 
Students Turn and Talk - using L1 or L2 
Have students reword their answers from before. 
Student response: The likeliness of _______ as the outcome is 

1 color

Outcome vocabulary

Students Language Level 1-3 - Students should get these phrases from answer frames provided on sentences strips. See function charts for answer frames.

Practice/Activities - 30 minutes -> in pairs

7. Students go back to their desks with their partner. 
8. Say: “Today you will be making a prediction of an outcome occurring and then play a game to see if your predictions are correct.”

9. Pass out premade cube/chip bags, and worksheets on pages. This sheet is modified, be sure to pass out the appropriate sheets to the specific levels of language ability.

10. Read directions out loud to students. Explain task.
11. Students work in pairs to complete the task.
Closure - 15 minutes

12. Say: "You are now creating a spinner that shows a particular outcome by yourself. You will be given a card with the specific outcome vocabulary. Do not show anyone your card. You will create a spinner that matches your card. When you are done making your card you will share it with a partner and they will have to guess what outcome your spinner is showing."

13. Explicitly model this entire process with the color green and less likely.

14. Write RED on the board. Say: "the outcome on your card must be shown using the color red."

15. Pass out the cards and a blank spinner, see page 23.

16. Give pairs of students 5 minutes to complete the task. Remind them not to share it with another person. After each student is done, have them stand on the rug with their spinner and index card.

17. Have students make 2 lines that face each other. Everyone should have a partner. The students will share their spinner with the person across from them. That person will guess what the likeliness of getting red with their spinner is. Have students explain why. Repeat with the student who has not shared.

Students Language Level 1-3 - Students should get these phrases from answer frames provided on sentences strips. See function charts for answer frames. page 3

18. After each pair has shared, answered, and explained, ask: "What is one new thing you learned today?" Have students turn and talk.
Mathematician __________________________ Date __________

Prediction Outcome Game
Language Levels 4-5

You and your partner were given a bag with 10 red, 5 yellow, and 15 blue chips.

Step 1: Write the likeliness of getting each chip.

Step 2: Put a Star next to the chip color you predict you will get the most. Put a sad face next to the chip color you think you will get the least.

Step 3: Take turns pulling a chip out of the bag 20 times total. Replace the chip each time. Record your findings in the Tally Chart.

<table>
<thead>
<tr>
<th>Chip Color</th>
<th>Likeliness</th>
<th>Tally Chart</th>
</tr>
</thead>
<tbody>
<tr>
<td>Red</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yellow</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Blue</td>
<td></td>
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</tr>
</tbody>
</table>

Were your predictions correct? ________________________________

Why or why not? ________________________________

__________________________________________

__________________________________________

__________________________________________
**Prediction Outcome Game**

**Language Levels 3**

In your bag you have: **10 red**, **5 yellow**, and **15 blue chips**.

**Step 1:** Write the likeliness of getting each chip.

<table>
<thead>
<tr>
<th>Likeliness Word Bank</th>
</tr>
</thead>
<tbody>
<tr>
<td>certain</td>
</tr>
<tr>
<td>less likely</td>
</tr>
<tr>
<td>more likely</td>
</tr>
<tr>
<td>impossible</td>
</tr>
<tr>
<td>equally likely</td>
</tr>
</tbody>
</table>

**Step 2:** Put a Star (🌟) next to the chip color you predict you will get the most. Put a sad face (😢) next to the chip color you think you will get the least.

**Step 3:** take turns pulling a chip out of the bag 20 times total. Put the chip back each time. Record your findings in the Tally Chart.

<table>
<thead>
<tr>
<th>Chip Color</th>
<th>Likeliness</th>
<th>Tally Chart</th>
</tr>
</thead>
<tbody>
<tr>
<td>Red</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yellow</td>
<td></td>
<td></td>
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<tr>
<td>Blue</td>
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</tbody>
</table>

My predictions ___________________ correct because there were ____________ chips in the bag and I pulled out ____________ _______ times.
Mathematician ___________________________ Date ____________

Prediction Outcome Game
Language Levels 1-2

In your bag you have: 10 red, 5 yellow, and 15 blue chips.

Step 1:

<table>
<thead>
<tr>
<th>Chip Color</th>
<th>Likeliness</th>
</tr>
</thead>
<tbody>
<tr>
<td>Red</td>
<td>certain</td>
</tr>
<tr>
<td></td>
<td>less likely</td>
</tr>
<tr>
<td></td>
<td>more likely</td>
</tr>
<tr>
<td></td>
<td>impossible</td>
</tr>
<tr>
<td></td>
<td>equally likely</td>
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<tr>
<td>Yellow</td>
<td>certain</td>
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<td>less likely</td>
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<td>more likely</td>
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<td>impossible</td>
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<td>equally likely</td>
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<td>Blue</td>
<td>certain</td>
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<td>more likely</td>
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<td></td>
<td>impossible</td>
</tr>
<tr>
<td></td>
<td>equally likely</td>
</tr>
</tbody>
</table>

Step 2: Put a Star (☆) next to the color you think you will get the most. Put a sad face (😢) next to the chip color you think you will get the least.

Step 3: Take turns pulling a chip out of the bag 20 times total. Put the chip back each time. Record your findings in the Tally Chart.

<table>
<thead>
<tr>
<th>Chip Color</th>
<th>Tally Chart</th>
</tr>
</thead>
<tbody>
<tr>
<td>Red</td>
<td></td>
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<tr>
<td>Yellow</td>
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<tr>
<td>Blue</td>
<td></td>
</tr>
</tbody>
</table>

Were your predictions correct? _________________________________
Chapter 5.4 Outcomes - Lesson 1 Day 3

Materials:
Overhead Projector/Document Camera
Transparency/or copy of pages (must be in color)
Markers/Pens
Modified Texts - from Day 1
Vocabulary Cards
Sentence Starter Cards (made from function chart)
Activity Worksheets from Curriculum Reteach and Extra Practice
Assessment Sheets

Model- 10 minutes

1. Review the lesson objectives with students. Say, "Today we are going to be working on:
   Content Objectives: analyze a math based visual and express the likelihood of a specific predicted outcome by using probability terms
   Language Objectives: In pairs, students will 1) Read a worksheet, 2) discuss the likeliness of an outcome using probability vocabulary, and 3) write the likeliness of an outcome using probability vocabulary.
2. On the overhead projector, show the first problem from page 26.
3. Read the problem out loud.
4. Model how to answer the question and thinking out loud for question 1. Use the answer frames to model your thinking.

Guided Practice- 10 minutes

5. On the overhead projector, show the 2nd problem from page 27.
6. Read the problem out loud.
7. Ask students to come up in front of the class. Ask: "Why are you doing this?", "How do you know to do that?"
8. Have a different student to come up and model for each part of question 2.

Guide students throughout this problem as needed.
Independent Practice - 30 minutes

9. Say: "Now it is time for you to practice these skills in pairs. You will be given papers to solve similar problems to these. I will be moving around the classroom to check up on your progress. If you need help, ask your group first. I will be sure to check in with each group."

10. Students should be placed in one of 2 groups: Language Level 4-5 or Language Level 1-3. Pass the modified worksheets out accordingly. See pages .

11. Students work in cooperative groups to complete the worksheets. Students may use their L1 or L2

12. Walk around the room to monitor students' conversations and work. As needed, become a part of their conversation; do NOT take it over. Guide students to correct answers and thinking. This is also a good time to focus on those students who need more support based on your observations and closing activities form day 1 and 2.

Assessment - 10 minutes

13. In small groups, students will be given worksheets, to complete to determine the probability of an outcome. See pages . These assessments are differentiated, be sure to pass out accordingly.

14. Be sure the students are given vocabulary cards form Lesson 1 and sentence frames from the functional chart based on their language levels. See the Performance Indicators Chart.
Predict the likelihood of an outcome.

Each spinner is spun once. Find the possible outcomes for each spinner, and the likelihood of landing on blue.

<table>
<thead>
<tr>
<th>Possible Outcomes</th>
<th>Blue</th>
<th>Blue, Yellow</th>
<th>Blue, Purple</th>
<th>Yellow, Purple</th>
</tr>
</thead>
<tbody>
<tr>
<td>Likelihood of Landing on Blue</td>
<td>Certain</td>
<td>Equally likely</td>
<td>Less likely</td>
<td>Impossible</td>
</tr>
</tbody>
</table>

Guided Practice

Describe the likelihood of each outcome as more likely, less likely, equally likely, certain, or impossible.

1. Look at the bags of cubes. A cube is drawn from each bag.

<table>
<thead>
<tr>
<th>Possible Outcomes</th>
<th>Green</th>
<th>Green, Yellow</th>
<th>Green, Yellow</th>
<th>Green, Yellow</th>
<th>Yellow</th>
</tr>
</thead>
<tbody>
<tr>
<td>Likelihood of Picking a Green Cube</td>
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</tbody>
</table>
Look at the spinners. Each spinner is spun once.

<table>
<thead>
<tr>
<th>Possible Outcomes</th>
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<tbody>
<tr>
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<td></td>
</tr>
<tr>
<td>Likelihood of Landing on Blue</td>
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</tbody>
</table>

Let's Explore!

WORKING TOGETHER

Work in groups of three.

Each group is given blank spinners. Design your own spinners by dividing the circles into 4, 6, or 8 equal parts and coloring each part. Show and record the possible outcomes when each spinner is spun once.

Describe the likelihood of each outcome as

1. Impossible
2. Certain
3. More likely
4. Less likely
5. Equally likely

Materials:
- Blank spinners
Lesson 5.4  Outcomes  Levels 4-5

Complete. Write more likely, less likely, certain, impossible, or equally likely.

1. It is _______________ that the spinner will land on 6.
2. It is _______________ that the spinner will land on a number from 1 to 6.
3. It is _______________ that the spinner will land on a number less than 5.
4. It is _______________ that the spinner will land on 8.
5. It is _______________ that the spinner will land on an even or an odd number.

Write more likely, less likely, certain, impossible, or equally likely for each of these statements.

6. I will go to college. __________________
7. I will grow 5 inches this week. ________________
8. My father is older than me. ________________
9. A coin will land on heads when it is tossed. ________________
10. A coin will land on heads or tails when it is tossed. ________________
Write the number of possible outcomes.

11. There are ______ possible outcomes when a coin is tossed.
12. There are ______ possible outcomes when the cube is tossed.
13. The spinner has ______ possible outcomes.

Study the data in the table. Write more likely, less likely, certain, impossible, or equally likely to describe each outcome.

<table>
<thead>
<tr>
<th>Color of Caps</th>
<th>Box A</th>
<th>Box B</th>
<th>Box C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Orange</td>
<td>9</td>
<td>0</td>
<td>6</td>
</tr>
<tr>
<td>Purple</td>
<td>3</td>
<td>8</td>
<td>6</td>
</tr>
<tr>
<td>Red</td>
<td>3</td>
<td>6</td>
<td>4</td>
</tr>
</tbody>
</table>

14. A purple cap is drawn from Box A. _________
15. An orange cap is drawn from Box B. _________
16. An orange or purple cap is drawn from Box C. _________
17. A green cap is drawn from Box C. _________
Worksheet 4  Outcomes

Describe the likelihood of each outcome. Write more likely, less likely, equally likely, certain, or impossible.

There are 2 red marbles and 4 blue marbles in a bag. One marble is drawn from the bag at a time.

Example

A red marble will be drawn from the bag.

Since there are fewer red marbles than blue marbles, it is less likely that a red marble will be drawn.

less likely

1. A blue marble will be drawn.

2. After two blue marbles are removed from the bag, a red marble will be drawn.

3. Four yellow marbles are now added to the bag in Exercise 2.
   a. A yellow marble will be drawn.
   b. A blue marble will be drawn.

4. All the red and blue marbles are removed from the bag in Exercise 3.
   a. A yellow marble will be drawn.
   b. A green marble will be drawn.
Find the possible outcomes. Then describe each likelihood using more likely, less likely, equally likely, certain, or impossible.

Look at the spinners. Each spinner is spun once.

**Example**

<table>
<thead>
<tr>
<th>Possible Outcome</th>
<th>Yellow</th>
</tr>
</thead>
<tbody>
<tr>
<td>Likelihood of Landing on Yellow</td>
<td>Certain</td>
</tr>
</tbody>
</table>

5.  

<table>
<thead>
<tr>
<th>Possible Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>Likelihood of Landing on Yellow</td>
</tr>
</tbody>
</table>

6.  

<table>
<thead>
<tr>
<th>Possible Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>Likelihood of Landing on Yellow</td>
</tr>
</tbody>
</table>

7.  

<table>
<thead>
<tr>
<th>Possible Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>Likelihood of Landing on Yellow</td>
</tr>
</tbody>
</table>
Check (✓) the correct statement that describes each possible outcome.

All the cubes are put into a bag and a cube is drawn from the bag.

Example

Yellow  Blue  Blue  Blue  Blue  Blue  Blue

a. You are more likely to draw a yellow cube than a blue cube.  

b. You are more likely to draw a blue cube than a yellow cube.  ✓

8.

Yellow  Blue  Blue  Blue  Blue  Blue

a. You are less likely to draw a yellow cube than a blue cube.  

b. You are less likely to draw a blue cube than a yellow cube.  

9.

Yellow  Blue  Blue  Blue  Blue  Blue

a. It is impossible to draw a yellow cube.  

b. It is impossible to draw a green cube.  

10.

Yellow  Yellow  Yellow  Yellow  Yellow  Yellow

a. It is certain that you will draw a yellow cube.  

b. It is certain that you will draw a blue cube.  

Reteach 4A  121
Read each description of the outcome. Then label the color of the parts of the spinner.

Each spinner is divided into 8 equal parts. Use B to represent blue and Y to represent yellow.

**Example**

It is more likely that the spinner will land on blue than on yellow.

11. It is impossible for the spinner to land on blue.

12. It is as equally likely that the spinner will land on blue as on yellow.

13. It is certain that the spinner will land on blue.
Assessment - Level 5

1. You have a box with 7 cards. 4 cards have the letter “B”. 3 cards have the letter “A”. What is the likelihood of pulling out a card with the “B” on it?

Explain how you got your answer.

2. Mrs. Lawrence’s prize box has 4 sparkly pens, 2 erasers, and 1 marker. What is the likelihood of pulling out an eraser without looking?

Explain how you got your answer.
1. You have a box with 7 cards. 4 cards have the letter "B". 3 cards have the letter "A". What is the likelihood of pulling out a card with the "B" on it?

   

Explain how you got your answer.

   

   

   

   

   

Mathematician ___________________________ Date ___________________


Assessment - Level 3

Use the vocabulary cards in your group to help you.

1. 4 cards have the letter "B". 3 cards have the letter "A". What is the likelihood of pulling out a card with the "B" on it?

   

Explain how you got your answer.

The outcome of getting a _____ out of the box is _________________. I know this because there are ______________________ of that card.
Assessment - Level 2

1. 4 cards have the letter "B". 3 cards have the letter "A". What is the likelihood of pulling out a card with the "B" on it?

   A  B  B  A
   B  A  B

   B = _____________

Pick 1:

<table>
<thead>
<tr>
<th>Word Bank 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>certain</td>
</tr>
<tr>
<td>impossible</td>
</tr>
</tbody>
</table>

Explain how you got your answer.

The outcome of getting a B out of the box is _____________.

Word Bank 1
I know this because there are _____________ of that card.

Word Bank 2

<table>
<thead>
<tr>
<th>More</th>
<th>less</th>
<th>equal numbers</th>
<th>none</th>
</tr>
</thead>
</table>
1. What is the likelihood of pulling out $\text{B}$?

The outcome of getting a $\text{B}$ out of the box is $\underline{\text{equally likely}}$. 
5.4 Outcome Modification Explanation

- There are clear language objectives.
- There is a focus on building background through explicitly linked experiences with the word “outcome”.
- Key vocabulary, such as “probability” is introduced, written, repeated, and used throughout the lesson.
- Throughout the lesson, there are clear explanations of tasks and the tasks are modeled at the beginning of each lesson.
- The lesson is scaffolded for each task.
- There are several hands-on activities and demonstrations that make the content more comprehensible.
- Students are given several opportunities to practice and use the new content knowledge.
- The hands-on activities are done in groups and therefore create frequent opportunities for interaction and discussion. This is done in small groups and with the teacher as she/he monitors students. Students are encouraged to use their L1 with other students during this discussion time to help them clarify and make the content more comprehensible.
- There are ample opportunities for students to clarify key concepts during modeling, guided practice, group discussions, and teacher monitoring. There are also ample opportunities for students to clarify concepts because of the pacing and multiple tasks for them to master the content.
- Worksheets are modified using visuals, word banks, and manipulative to make the content more comprehensible for the students. Worksheets and other texts are given visual clues by using color for texts and pictorial representations of objects.
- The text is modified in 2 levels to make it more comprehensible for the students. The modification of texts use graphic organizers to make the content more comprehensible.
- Worksheets, texts, and assessments are modified based on students’ language abilities.
- All activities for this lesson involve language skills: reading, listening, and speaking.
- This lesson is modified based on the language abilities. The content does not change. All students are expected to learn the same outcome, “to determine the probability of an event by expressing it in a fraction.”
Lesson 2
# Probability & Stats: Chapter 5.5 Probability as a Fraction - Lesson 2

<table>
<thead>
<tr>
<th>Content Objectives</th>
<th>Language Objectives</th>
</tr>
</thead>
</table>
| Students will be able to determine the probability of an event by expressing it in a fraction. | In small groups, students will:  
  a) Read a worksheet  
  b) Discuss the probability of an outcome occurring. |

<table>
<thead>
<tr>
<th>Domain/Topic</th>
<th>Fluent Bridging Level 5</th>
<th>Expanding Fluency Level 4</th>
<th>Speech Emerging Level 3</th>
<th>Early Production Level 2</th>
<th>Preproduction Level 1</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Reading:</strong> Reading a worksheet</td>
<td>Students will silently read the probability word problems, being able to orally express the important information needed to answer the problem in full sentences.</td>
<td>Students will read aloud the probability word problem, being able to orally express the important information needed to answer the problem in short phrases.</td>
<td>Students will chorally read aloud the probability word problem, underlining the important information needed to answer the problem.</td>
<td>Students will read aloud, by repeating me, the probability word problem. Students will label the picture representation to answer the problem.</td>
<td>Students will use a picture problem and label the important information needed to solve a problem through a probability picture.</td>
</tr>
<tr>
<td><strong>Speaking:</strong> probability in a fraction</td>
<td>In small groups, students will express the probability of an outcome in fraction form, by leading discussion of the probability problems.</td>
<td>Students will express the probability of an outcome in fraction form, by fully participating in a discussion of the probability problem.</td>
<td>Students will express the probability of an outcome in fraction form, in group discussion of the probability problem with vocabulary cards and sentence starters.</td>
<td>Students will express the probability of an outcome in fraction form, in group discussion using 1-2 word phrases with the aid of with vocabulary cards.</td>
<td>Students will express the probability of an outcome in fraction form, by pointing to the correct probability vocabulary cards.</td>
</tr>
</tbody>
</table>
## Functional Chart: Lesson 2

<table>
<thead>
<tr>
<th>Function</th>
<th>Situation</th>
<th>Expression</th>
<th>Words</th>
<th>Grammar</th>
</tr>
</thead>
<tbody>
<tr>
<td>Identifying and</td>
<td>Explain of identifications and thinking.</td>
<td>There are _1_ 2_ cubes out of _1_ total.</td>
<td>1) Digits: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, etc.</td>
<td>Adjectives</td>
</tr>
<tr>
<td>Justifying</td>
<td></td>
<td></td>
<td>2) red, green, blue, yellow, purple, orange</td>
<td></td>
</tr>
</tbody>
</table>
Chapter 5.5 Probability as a Fraction - Lesson 2 Day 1

Materials:
Clear bag with the following chips: 4 red, 2 yellow, 1 green, 1 blue
Chart paper
Markers
Modified Texts
Decks of cards for each group
Copies of activity Worksheets - Finding the Probability
Sentence strips with answer frames from lesson 1

Building Background Knowledge - 5 Minutes

1. Meet students on the rug whole group.
2. Show students a bag of chips.
3. Say, “If I were to pull out a chip out of this bag without looking, what are the possible outcomes?”
   Students Turn and Talk and Share Out
   Students will state: red, yellow, green, blue
   Record answers on chart paper.
4. Say, “What is the likeliness of pulling out _______?” (fill in with each color)
   Students Turn and Talk and Share Out
   Students will state:
   • More likely (red)
   • less likely (yellow, green, blue)
   Record answer on chart paper.
5. After each likeliness question follow up with, “How do you know?”
   Students Turn and Talk and Share Out
   Students will state:
   • Because there are more red chips.
   • There are (only) ______ ______ chips.

   # color

Students with Language Level 1 -3- Be sure to allow students to use sentence strips with answer frames from lesson one.
Vocabulary and Modified Text - 10 minutes

6. Review the lesson objectives with students. Say, “Today we are going to be working on:

   **Content Objectives:** Determine the probability of an event by expressing it in a fraction.

   **Language Objectives:** In small groups, students will, 1) read a worksheet and 2) discuss the probability of an outcome occurring.

7. “Today we will be talking about likelihood using fractions. We call this probability.”

8. Pass out Texts - See modified texts on pages 44-45 - be sure to pass out the appropriate sheets to the specific levels of language ability.

9. Partners read texts. Pull the group of Language Level 1 & 2 students and read it with them.

10. Review the phrase favorable outcome. Say, “the favorable outcome is the outcome you want.”

11. Review- Ask, “What are the parts of a fraction?”

   Student response - **Numerator**
   
   **Denominator**

**Teaching Model & Guided Practice 10**

12. Show bag clear bag again from the beginning of the lesson.

13. Say, “I’m going to show you how to find the probabilities each of the outcomes of the chips.”


15. Model Think-A-Loud, “There are 8 total chips in this bag. That is my denominator. There is only 1 blue chip out of these 8 chips.”

16. Write the fraction and words out on chart paper.
17. Ask, "What is the probability of getting _______ chip?" Do this for the 3 other colors. Students turn and talk and share out. Student responses:
   - Red - 4 out of 8
   - Yellow - 2 out of 8
   - Green - 1 out of 8

Record responses on the chart paper.

18. After each question say, "how did you figure that out?"
Student response: "Because there are ______ ______ chips out of 8 total chips # color

Independent Practice/Activities - 30 minutes

19. Place students in groups at their desks/tables.
20. Find activity paper for students on pages 46-48 (Find the Probability) pass out. This sheet is modified, be sure to pass out the appropriate sheets to the specific levels of language ability.
21. Pass out decks of cards to each group.
22. Read students the directions. Students can use their texts/notes for help.

Closer- 5 minutes

23. Regroup on the rug and ask, "How do you write the probability of a wanted outcome happening?"
24. Student Think Pair Share and write the responses on a sticky note.
25. Ask students share out.
5.5 Probability as a Fraction
Language Level 1-3

Probability - the likeliness of an outcome happening shown in a fraction

To find the probability of a wanted outcome:

The outcome you want
Total possible outcomes

Example:

What is the Probability of landing on the number 5?

Answer: \( \frac{1}{6} \)
Lesson Objectives

- Determine the probability of an event.
- Express probability as a fraction.

**Express the likelihood of an outcome as a fraction.**

The spinner has 6 equal parts. When the spinner is spun once, there are 6 possible outcomes. The likelihood of landing on any 1 of the 6 outcomes is equal. So, the chance of getting any 1 of the numbers is 1 out of 6, or \( \frac{1}{6} \).

A **favorable outcome** is a result you are looking for. If you are hoping to land on 5, then 5 is the favorable outcome.

The likelihood or **probability** of getting a favorable outcome can be written as a fraction.

\[
\text{Probability of a favorable outcome} = \frac{\text{Number of favorable outcomes}}{\text{Total number of possible outcomes}}
\]

Likelihood or probability of landing on 5 = \( \frac{1}{6} \)
**Finding the Probability**

**Level 4-5**

Using a deck of cards, find the probability of getting the following outcomes.

HINT: There are 52 cards in a deck.

<table>
<thead>
<tr>
<th>Favorable Outcome</th>
<th>Probability</th>
<th>Likeliness</th>
</tr>
</thead>
<tbody>
<tr>
<td>Red</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Black</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hearts</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spades</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Diamonds or Clubs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Jack or 8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Black 7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Queen of Diamonds</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Finding the Probability

Using a deck of cards, find the probability of getting the following outcomes.

HINT: There are 52 cards in a deck.

<table>
<thead>
<tr>
<th>Favorable Outcome</th>
<th>Probability</th>
<th>Likeliness</th>
</tr>
</thead>
<tbody>
<tr>
<td>Red</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Black</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hearts</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spades</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Diamonds</td>
<td></td>
<td></td>
</tr>
<tr>
<td>or</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clubs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Jack (J) or 8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Black 7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Queen (Q) of Diamonds</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
**Finding the Probability**

**Level 1-2**

Using a deck of cards, find the probability of getting the following outcomes.

**HINT:** There are 52 cards in a deck.

<table>
<thead>
<tr>
<th>Favorable Outcome</th>
<th>Probability</th>
<th>Likeliness</th>
</tr>
</thead>
<tbody>
<tr>
<td>Red</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Black</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hearts ♠️</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spades ♦️</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Diamonds or Clubs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Jack (J) or 8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Black 7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Queen (Q) ♦️ of Diamonds</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Likelihood Word Bank**

<table>
<thead>
<tr>
<th>certain</th>
<th>less likely</th>
<th>more likely</th>
<th>impossible</th>
<th>equally likely</th>
</tr>
</thead>
</table>
Chapter 5.5 Probability as a Fraction - Lesson 2 Day 2

Materials:
Clear bag with the following coins: 3 pennies, 2 nickels, 1 quarter, 3 dimes
Chart paper
Markers
Modified Texts - from Day 1
2 dice - per group
Color Copy of Digit Cards 1-6 - 1 per group
Copy of activity Worksheets - "What's the Probability? - Dice"

Review - 15 minutes
1. Meet students on the rug whole group.
2. Review the lesson objectives with students. Say, "Today we are going to be working on:
   Content Objectives: Determine the probability of an event by expressing it in a fraction.
   Language Objectives: In small groups, students will, 1) read a worksheet and 2) discuss the probability of an outcome occurring.
3. Show students a bag of coins.
4. Say, "If I were to pull out a coin out of this bag without looking, what are the possible outcomes?"
   Students Turn and Talk and Share Out
   Students will state: pennies, nickels, dimes, and quarters
   Ask a student to come up to the chart paper to record their answers.
5. Ask: "How do we write the probability of a wanted or favorable outcome happening?"
   Student Turn and Talk and Share out.
   Students will state:
   - In a fraction
   - Denominator is the total number of items/outcomes.
   - Numerator is the total number of wanted outcomes.
6. Ask: "What is the probability of pulling out _________?" (fill in with each coin)
   Students Turn and Talk and Share Out
   Students will state:
   - quarters - 1/9
   - nickels - 2/9
   - dimes - 3/9
   - pennies - 3/9

   Have the students record it on the answers on chart paper.

7. Ask: "What is the likeliness of each coin being pulled?"
   - quarters - less likely
   - nickels - less likely (if students are ready introduce the concept of less vs. least likely)
   - dimes - most likely/equally likely
   - pennies - most likely/equally likely

   Have the students record it on the answers on chart paper.

8. After each question say, "how did you figure that out?"
   Student response: "Because there are ______ ______ out of 9 total coins
   # coin

Independent Practice/Activities - 35 minutes

9. Place students in groups at their desks/tables.
10. Find activity paper for students on pages 52-56: What's the Probability? Dice) and pass out. This sheet is modified, be sure to pass out the appropriate sheets to the specific levels of language ability.
11. Pass out dice and digit cards to each group.
12. Read students the directions.
13. Discuss what they notice about dice.
   Students state: each dice is numbered 1-6
   Show that some students have cards numbered 1-6.
14. Model how to make combinations on dice.
15. Have students begin task. **Students can use their texts/notes for help.**
Closure - 10 minutes

16. Have students share results with a different group.
17. Students will discuss what their answers were and why.
<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
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<tr>
<td>2</td>
<td>2</td>
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<tr>
<td>3</td>
<td>3</td>
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<tr>
<td>4</td>
<td>4</td>
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<tr>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>6</td>
<td>6</td>
</tr>
</tbody>
</table>

Digit Cards
What's the Probability? Dice - Level 3-5

Record the different combinations to get the specific outcome list. Use the dice or digit cards to help you.

<table>
<thead>
<tr>
<th>Outcomes</th>
<th>Ways to get those outcomes</th>
<th>Total Number of ways</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td></td>
<td></td>
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<tr>
<td>6</td>
<td></td>
<td></td>
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<tr>
<td>7</td>
<td></td>
<td></td>
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<tr>
<td>8</td>
<td></td>
<td></td>
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<tr>
<td>9</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**TOTAL COMBINATIONS:**
Write the probability of getting each outcome.

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Probability of getting that outcome</th>
<th>Outcome</th>
<th>Probability of getting that outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td></td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td></td>
<td>9</td>
<td></td>
</tr>
<tr>
<td>4</td>
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<td>10</td>
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<td>5</td>
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<td>11</td>
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<td>7</td>
<td></td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>2 or 10</td>
<td></td>
<td>3, 12, or 8</td>
<td></td>
</tr>
</tbody>
</table>

Which outcome had the most ways of being made? ____________________

Which outcome had the least ways of being made? ____________________

What is the total number of combinations? ____________________
**What's the Probability? Dice - Level 1 & 2**

Record the different combinations. Use the digit cards to help you. Use only 1 black and 1 green digit for each combination. Circle the number combinations. Keep an organized list.

<table>
<thead>
<tr>
<th>Combination</th>
<th>Outcome</th>
<th>Combination</th>
<th>Outcome</th>
<th>Combination</th>
<th>Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 2 3 4 5 6</td>
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<td>1 2 3 4 5 6</td>
<td>1 2 3 4 5 6</td>
</tr>
</tbody>
</table>

**Total Combinations:**

55
Write the probability of getting each outcome.

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Probability of getting that outcome</th>
<th>Outcome</th>
<th>Probability of getting that outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td></td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td></td>
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<td></td>
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<tr>
<td>4</td>
<td></td>
<td>10</td>
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<td>5</td>
<td></td>
<td>11</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td></td>
<td>12</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td></td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>2 or 10</td>
<td></td>
<td>3, 12, or 8</td>
<td></td>
</tr>
</tbody>
</table>

Which outcome had the most ways of being made? ______________________

Which outcome had the least ways of being made? ______________________

What is the total number of combinations? ______________________
Chapter 5.5 Probability as a Fraction - Lesson 2 Day 3

Materials:
Overhead Projector/Document Camera
Transparency/or copy of pages
Markers/Pens
Modified Texts - from Day 1
Vocabulary Cards
Sentence Starter Cards (made from function chart)
Activity Worksheets from Curriculum Reteach and Extra Practice
Assessment Sheets

Model - 10 minutes

1. Review the lesson objectives with students. Say, "Today we are going to be working on:

   **Content Objectives:** Determine the probability of an event by expressing it in a fraction.

   **Language Objectives:** In small groups, students will, 1) read a worksheet and 2) discuss the probability of an outcome occurring.

2. On the overhead projector, show the first problem from page 60.
3. Read the problem out loud: "Jake played a dart game at a carnival and won first place. He was asked to pick his prize from a bag that contained the names of these prizes - 4 caps, 3 baseballs, 2 pairs of sneakers, 1 skateboard.

4. Model how to use CUBES with the word problem.
   
   **C - Circle the important numbers**

   **U - Underline the question**

   **B - Box the key words**

   **E - Eliminate the unneeded information**

   **S - Solve the problem**

5. Draw a model of the prizes, for the students, on the overhead.
6. Model how to find the probability for questions 1 - 6.
Guided Practice- 10 minutes

7. On the overhead projector, show the 2nd problem from page 61.
8. Read the problem out loud.
9. Ask students to come up to do CUBES (see above) in front of the class. Ask: "Why are you doing this?", "How do you know to do that?"
10. Have a different student to come up and draw a model.
11. Ask students to come up to solve problems 7-10.
   Guide students throughout this problem as needed.

Independent Practice- 30 minutes

12. Say: "Now it is time for you to practice these skills in groups. You will be given papers to solve similar problems to these. I will be moving around the classroom to check up on your progress. If you need help, ask your group first. I will be sure to check in with each group."
13. Students should be placed in one of 2 groups: Language Level 4-5 or Language Level 1-3. Pass the modified worksheets out accordingly. See pages .
14. Students work in cooperative groups to complete the worksheets.
15. Walk around the room to monitor students' conversations and work. As needed, become a part of their conversation; do NOT take it over. Guide students to correct answers and thinking. This is also a good time to focus on those students who need more support based on your observations and closing activities form day 1 and 2.
Assessment - 10 minutes

16. In small groups, students will be given worksheets, to complete to determine the probability of an outcome. See pages . These assessments are differentiated, be sure to pass out accordingly.

17. Be sure the students are given vocabulary cards from Lesson 1 and sentence frames from the functional chart based on their language levels. See the Performance Indicators Chart.
Hands-On Activity

Make 4 red cards, 16 green cards, and 0 yellow cards using the blank cards and colored markers.

1. Find the probability of drawing each of the three colors.

2. Label each outcome as impossible, less likely, equally likely, more likely, or certain based on where the fraction lies on the number line from 0 to 1.

3. Mix the cards and shuffle them together, face down. Take turns to draw one card from the pack 30 times and record the results in a tally chart. Replace the cards each time. Compare the results with the probabilities you found.

Did the less likely outcome happen less often than the more likely outcome? How often did the impossible outcome happen?

Let's Practice

Find each probability as a fraction. Then describe the likelihood of each outcome as certain, impossible, less likely, more likely, or equally likely.

Jake played a dart game at a carnival and won first place. He was asked to pick his prize from a bag that contained the names of these prizes — 4 caps, 3 baseballs, 2 pairs of sneakers, and 1 skateboard.

1. Probability of getting a pair of sneakers =

2. Probability of getting a baseball =

3. Probability of getting a skateboard =
1. Probability of getting a cap or a pair of sneakers =

5. Probability of getting a baseball or a skateboard =

6. Probability of getting a football =

**Find each probability as a fraction. Draw a number line and mark a point on the number line for each probability.**

Jake's younger sister Shawna came in at third place. She wanted to win a beaded bracelet. Her bag of prizes had the names of these prizes — 4 soft toys, 2 caps, and 1 beaded bracelet.

7. Probability of getting Shawna's favorable outcome =

8. Probability of getting a soft toy =

9. Probability of getting a cap or a beaded bracelet =

10. Probability of getting a beaded bracelet, a cap, or a soft toy =
Lesson 5.5 Probability as a Fraction

Find the probability as a fraction in simplest form.

1. Aleesha spins the spinner once. She wants to land on a number greater than 4. What is the probability of a favorable outcome?

   ![Hexagon spinner with numbers 1, 2, 3, 4, 5, 6]

   a. There are ________ favorable outcomes.

   b. There are ________ possible outcomes.

   c. Probability of a favorable outcome =

      

      

Alesha spins the spinner again.

2. What is the probability that the spinner will land on 4?

3. What is the probability that the spinner will land on an even number?

4. What is the probability that the spinner will land on a number less than 5?

5. What is the probability that the spinner will land on a number less than 7?
Find the probability of each outcome on the number line. Write each probability as a fraction in simplest form. Then describe the outcome as more likely, less likely, certain, impossible, or equally likely.

A bag contains 3 red balls, 4 blue balls, 2 green balls, and 1 yellow ball. Find the probability of drawing

6. a yellow ball: 

It is __________ that a yellow ball will be drawn from the bag.

7. a green ball: 

It is __________ that a green ball will be drawn from the bag.

8. a yellow ball or a green ball: 

It is __________ that a yellow or a green ball will be drawn from the bag.

9. a green ball, a red ball, or a blue ball: 

It is __________ that a green, red, or a blue ball will be drawn from the bag.

Chapter 5  Lesson 5.5
Find the probability as a fraction in simplest form.

A set of 12 cards is numbered from 1 to 12.

Find the probability of drawing

10. a card greater than 7: 

11. an odd number: 

12. a card less than 10: 

13. an even number: 

14. a 1-digit number: 

15. a 2-digit number:
Draw.

A spinner has 8 equal parts. Four of the parts are green, 2 of the parts are purple, and the last 2 parts are blue and red.

16. Draw the spinner with the correct colored parts.

Find the probability as a fraction in simplest form.

Find the probability of landing on

17. purple: 

18. green: 

19. blue or red: 

20. yellow: 

84 Chapter 5 Lesson 5.5
Worksheet 5  Probability as a Fraction

Find the probability as a fraction in simplest form.

Shawn made a spinner with 6 equal parts. He labeled each part with the numbers 1 through 6. Shawn spins the spinner once.

Example

Find the probability of landing on 2 or 3.

Step 1  Find the number of favorable outcomes.
There are only ___2___ favorable outcomes.

Step 2  Find the total number of possible outcomes.
There are ___6___ possible outcomes.

Step 3  Find the probability as a fraction.
Probability of a favorable outcome

\[
\text{Probability of a favorable outcome} = \frac{\text{Number of favorable outcomes}}{\text{Total number of possible outcomes}} = \frac{2}{6} = \frac{1}{3}
\]

The probability of landing on 2 or 3 is \(\frac{1}{3}\).
1. The probability of landing on an odd number.

The odd numbers are __________, __________, and __________.

Number of favorable outcomes = __________

Number of possible outcomes = 6

Probability of landing on an odd number

\[
\text{Probability} = \frac{\text{Number of favorable outcomes}}{\text{Total number of possible outcomes}} = \frac{\Box}{6} = \Box
\]

The probability of landing on an odd number is __________.

2. The probability of landing on a number less than 5.

The numbers less than 5 are __________, __________, __________, and __________.

Number of favorable outcomes = __________

Number of possible outcomes = __________

Probability of landing on a number less than 5

\[
\text{Probability} = \frac{\text{Number of favorable outcomes}}{\text{Total number of possible outcomes}} = \frac{\Box}{6} = \Box
\]

The probability of landing on a number less than 5 is __________.
3. The probability of landing on a number greater than 3.

The numbers greater than 3 are ______, ______, and ______.

Number of favorable outcomes = ______

Number of possible outcomes = ______

Probability of landing on a number greater than 3

\[
\frac{\text{Number of favorable outcomes}}{\text{Total number of possible outcomes}} = \frac{\,}{\,} = \frac{\,}{\,}
\]

The probability of landing on a number greater than 3 is ______.
Find each probability on the number line as a fraction in simplest form. Then describe the probability of each outcome as certain, impossible, more likely, less likely, or equally likely.

There are 5 red cubes, 3 green cubes, and 2 yellow cubes in a bag. One cube is drawn from the bag.

Example

The probability of drawing a green cube is \( \frac{3}{10} \).

The number line shows that the likelihood of this outcome is less likely as \( \frac{3}{10} \) is nearer to \( \frac{0}{10} \) than to \( \frac{10}{10} \).

The closer the probability of an outcome is to 1, the more likely the outcome is to occur.

4. The probability of drawing a red cube.

Probability: \( \frac{5}{10} = \frac{5}{10} \)  
Likelihood of outcome: ________

126  Chapter 5  Lesson 5.5
5. The probability of drawing a yellow cube.

![Diagram showing yellow cubes]

Probability: \( \frac{\square}{\square} = \frac{\square}{\square} \)

Likelihood of outcome: 

6. The probability of drawing a red cube or a yellow cube.

![Diagram showing red and yellow cubes]

Probability: \( \frac{\square}{\square} = \frac{\square}{\square} \)

Likelihood of outcome: 

7. The probability of drawing a blue cube.

![Diagram showing blue cubes]

Probability: \( \frac{\square}{\square} = \frac{\square}{\square} \)

Likelihood of outcome: 

Find the probability of each outcome. Then describe the outcome as certain, impossible, more likely, less likely, or equally likely.

Joyce has a set of 10 animal cards. There are 5 dog cards, 2 cat cards, 2 rabbit cards, and 1 bird card in the set. She shuffles the cards, places them face down in a stack, and draws the first card from the top of the stack.

**Example**

Probability of a dog card $= \frac{5}{10} = \frac{1}{2}$

It is **equally likely** to draw a dog card.

8. Probability of a rabbit card $= \frac{}{} = \frac{}{}$ Likelihood of outcome: _____

9. Probability of a dog or a cat card $= \frac{}{}$ Likelihood of outcome: _____

10. Probability of a cat, rabbit, or a bird card $= \frac{}{} = \frac{}{}$

Likelihood of outcome: _____

11. Probability of a dog, cat, rabbit, or bird card $= \frac{}{} = \frac{}{}$

Likelihood of outcome: _____

12. Probability of a mouse card $= \frac{}{} = \frac{}{}$ Likelihood of outcome: _____
1. A bag contains 2 red cubes, 3 yellow cubes, and 3 blue cubes. Find each probability below when you pick one cube from the bag.

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Probability</th>
<th>Likeliness</th>
</tr>
</thead>
<tbody>
<tr>
<td>Green</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yellow</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Red or yellow</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Red, yellow, or blue</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

2. Elena made a spinner with 8 equal parts.

Find the probability if of landing on an even number when you spin the spinner once.

Find the probability of landing on a number divisible by 3.
5.5 Assessment - Level 4

A bag contains 2 red cubes, 3 yellow cubes, and 3 blue cubes. Find each probability below when you pick one cube from the bag.

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Probability</th>
<th>Likeliness</th>
</tr>
</thead>
<tbody>
<tr>
<td>Green</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yellow</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Red or yellow</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Red, yellow, or blue</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
A bag has 2 red cubes, 3 yellow cubes, and 3 blue cubes. If you pulled out one cube, what is the probability and likeliness of each outcome below?

Use the likeliness vocabulary cards in your group to help you.

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Probability</th>
<th>Likeliness</th>
</tr>
</thead>
<tbody>
<tr>
<td>Green</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yellow</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Red or yellow</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Red, yellow, or blue</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### 5.5 Assessment - Level 2

A bag has 2 red cubes, 3 yellow cubes, and 3 blue cubes.

If you pulled out one cube, what is the probability and likeliness of each outcome below?

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Probability</th>
<th>Likeliness</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Green</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Yellow</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Red or yellow</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Red, yellow, or blue</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Likelihood Word Bank**
- certain
- less likely
- more likely
- impossible
- equally likely
If you pulled out one cube, what is the probability and likeliness of each outcome below?

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Probability</th>
<th>Likeliness</th>
</tr>
</thead>
<tbody>
<tr>
<td>Green</td>
<td></td>
<td>certain</td>
</tr>
<tr>
<td></td>
<td></td>
<td>less likely</td>
</tr>
<tr>
<td></td>
<td></td>
<td>more likely</td>
</tr>
<tr>
<td></td>
<td></td>
<td>impossible</td>
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<tr>
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<td></td>
<td>equally likely</td>
</tr>
<tr>
<td>Yellow</td>
<td></td>
<td>certain</td>
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<td></td>
<td></td>
<td>less likely</td>
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<td></td>
<td>more likely</td>
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<td></td>
<td></td>
<td>impossible</td>
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<tr>
<td></td>
<td></td>
<td>equally likely</td>
</tr>
<tr>
<td>Red or yellow</td>
<td></td>
<td>certain</td>
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<td></td>
<td>impossible</td>
</tr>
<tr>
<td></td>
<td></td>
<td>equally likely</td>
</tr>
<tr>
<td>Red, yellow, or blue</td>
<td></td>
<td>certain</td>
</tr>
<tr>
<td></td>
<td></td>
<td>less likely</td>
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<td></td>
<td>more likely</td>
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<td></td>
<td>impossible</td>
</tr>
<tr>
<td></td>
<td></td>
<td>equally likely</td>
</tr>
</tbody>
</table>
5.5 Probability as a Fraction Modification Explanation

- There are clear language objectives.
- There is a focus on building background through explicitly linked experiences from the prior lesson on likeliness vocabulary.
- Key vocabulary, such as "probability" is introduced, written, repeated, and used throughout the lesson.
- Throughout the lesson, there are clear explanations of tasks and the tasks are modeled at the beginning of each lesson.
- The lesson is scaffolded for each task.
- There are several hands-on activities and demonstrations that make the content more comprehensible.
- Students are given several opportunities to practice and use the new content knowledge.
- The hands-on activities are done in groups and therefore create frequent opportunities for interaction and discussion. This is done in small groups and with the teacher as she/he monitors students. Students are encouraged to use their L1 with other students during this discussion time to help them clarify and make the content more comprehensible.
- There are ample opportunities for students to clarify key concepts during modeling, guided practice, group discussions, and teacher monitoring. There are also ample opportunities for students to clarify concepts because of the pacing and multiple tasks for them to master the content.
- Worksheets are modified using visuals, word banks, and manipulative to make the content more comprehensible for the students. Worksheets and other texts are given visual clues by using color for texts and pictorial representations of objects.
- The text is modified in 2 levels to make it more comprehensible for the students.
- Worksheets, texts, and assessments are modified based on students' language abilities.
- All activities for this lesson involve language skills: reading, listening, and speaking.
- This lesson is modified based on the language abilities. The content does not change. All students are expected to learn the same outcome, "to determine the probability of an event by expressing it in a fraction."
Lesson 3
**Probability & Stats: Chapter 5.6 Real World Problems - Lesson 3**

<table>
<thead>
<tr>
<th>Content Objectives</th>
<th>Language Objectives</th>
</tr>
</thead>
<tbody>
<tr>
<td>Students will be able to solve real-world problems involving probability.</td>
<td>In small groups, students will:</td>
</tr>
<tr>
<td></td>
<td>a) Read a worksheet</td>
</tr>
<tr>
<td></td>
<td>b) Discuss the likeliness and the actual probability of an outcome occurring</td>
</tr>
<tr>
<td></td>
<td>c) Write the likeliness and actual probability of an outcome occurring</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Domain/Topic</th>
<th>Fluent Bridging Level 5</th>
<th>Expanding Fluency Level 4</th>
<th>Speech Emerging Level 3</th>
<th>Early Production Level 2</th>
<th>Preproduction Level 1</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Reading:</strong></td>
<td></td>
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</tr>
<tr>
<td>Reading: Reading a worksheet</td>
<td>Students will silently read the probability word problems, being able to orally express the important information needed to answer the problem in full sentences.</td>
<td>Students will read aloud the probability word problem, being able to orally express the important information needed to answer the problem in short phrases.</td>
<td>Students will chorally read aloud the probability word problem, underlining the important information needed to answer the problem.</td>
<td>Students will read aloud, by repeating me, the probability word problem. Students will label the picture representation to answer the problem.</td>
<td>Students will use a picture problem and label the important information needed to solve a problem through a probability picture.</td>
</tr>
<tr>
<td><strong>Speaking:</strong></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Speaking: Prediction of an outcome and probability of an outcome</td>
<td>In pairs, students will express the likeliness of an outcome and its probability, using probability terms by leading discussion of the probability problems.</td>
<td>Students will express the likeliness of an outcome and its probability, using probability terms by fully participating in a discussion of the probability problem.</td>
<td>Students will express the likeliness of an outcome and its probability, using probability terms in group discussion of the probability problem with vocabulary cards and sentence starters.</td>
<td>Students will express the likeliness of an outcome and its probability, using probability terms in pointing to the correct probability vocabulary cards.</td>
<td>Students will express the likeliness of an outcome and its probability, using probability terms in pointing to the correct probability vocabulary cards.</td>
</tr>
<tr>
<td><strong>Writing:</strong></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Writing: the explanation of getting a specific outcome</td>
<td>Students will write their answers and explanations to the probability problems in a short paragraph.</td>
<td>Students will write their answer and explanations to the probability problem in 2-3 sentences.</td>
<td>Students will write their answer and explanations to the probability problem in 2-3 sentences using sentence starters.</td>
<td>Students will write their answer and explanations to the probability problem using a fill in the blank/word bank answer frames.</td>
<td>Students will answer the probability problem by circling the probability vocabulary that matches the picture problem. Students will then copy and the words they have circled.</td>
</tr>
</tbody>
</table>
### Functional Chart: Lesson 3

<table>
<thead>
<tr>
<th>Function</th>
<th>Situation</th>
<th>Expression</th>
<th>Words</th>
<th>Grammar</th>
</tr>
</thead>
<tbody>
<tr>
<td>Identifying and Predicting</td>
<td>Make a prediction of given situation occurring.</td>
<td>The outcome is <strong>1</strong>.</td>
<td>1) Certain, unlikely Likely, impossible, equally likely</td>
<td>Adjectives</td>
</tr>
<tr>
<td></td>
<td></td>
<td>I predict <strong>2</strong> is the <strong>3</strong> outcome.</td>
<td>2) girl, boy</td>
<td>Noun</td>
</tr>
<tr>
<td></td>
<td></td>
<td>The likeliness of <strong>2</strong> as the outcome is <strong>1</strong>.</td>
<td>3) less likely, more likely, certain</td>
<td>Comparison</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(more /less)</td>
</tr>
<tr>
<td>Justifying</td>
<td>Explain predictions, probability, and thinking.</td>
<td><strong>1</strong> will (not) be the outcome because there are <strong>2</strong> of that color cubes.</td>
<td>1) boys, girls</td>
<td>Nouns</td>
</tr>
<tr>
<td></td>
<td></td>
<td>There are <strong>3</strong> <strong>4</strong> out of <strong>3</strong> total.</td>
<td>2) more, less, equal/same amounts, none</td>
<td>Adjectives</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>3) Digits: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, etc.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>4) boys, girls</td>
<td></td>
</tr>
</tbody>
</table>
Chapter 5.6 Real-world problems: Data and Probability - Lesson 3 Day 1

Materials:
Overhead Projector/Document Camera
Transparency/or copy of pages
Markers/Pens
Modified Texts - from lessons 1 and 2
Sentence Starter Cards (made from function chart)
Activity Worksheets
crayons
Sticky notes

Model - 15 minutes

1. Review the lesson objectives with students. Say, "Today we are going to be working on:
   
   **Content Objectives:** Solve real-world problems involving probability.
   **Language Objectives:** In small groups, students will 1) read a worksheet, 2) discuss the likeliness and the actual probability of an outcome occurring and 3) write the likeliness and actual probability of an outcome occurring.

2. Say: "You will have to use all of the knowledge we have learned about outcomes and probability so far."

3. On the overhead projector, show the first problem from page 83.

4. Read the problem out loud: "A bag contains 1 red cube and 8 blue cubes. Nick picks a cube from the bag.
   
   a. What is the probability that he picks a red cube?
   b. If Nick puts the cube back into the bag and picks a cube from the bag again. What is the probability that the second cube is red?
   c. If Nick does not put the first cube back and picks a cube from the bag again, what is the probability that the second cube is red?"
5. Model how to use CUBES with the word problem.
   C - Circle the important numbers
   U - Underline the question
   B - Box the key words
   E - Eliminate the unneeded information
   S - Solve the problem

6. Draw a model of the cubes, for the students, on the overhead.
7. Model how to find the probability for questions a-c.

**Guided Practice - 10 minutes**

8. On the overhead projector, show the 2nd problem from page 84.
9. Read the problem out loud.
10. Ask students to come up to do CUBES (see above) in front of the class. Ask: “Why are you doing this?”, “How do you know to do that?”
11. Have a different student to come up and draw a model.
12. Ask students to come up to solve problems a - c.

*Guide students throughout this problem as needed.*

**Independent Practice - 30 minutes**

13. Say: “Now it is time for you to practice these skills in groups. You will be given papers to solve similar problems to these. I will be moving around the classroom to check up on your progress. If you need help, ask your group first. I will be sure to check in with each group.”
14. Students should be placed in one of 2 groups: Language Level 4-5 or Language Level 1-3. **Pass the modified worksheets out accordingly.** See pages 85-88
15. Students work in cooperative groups to complete the worksheets.
16. Walk around the room to monitor students' conversations and work. As needed, become a part of their conversation; do NOT take it over. Guide students to correct answers and thinking. This is also a good time to focus on those students who need more support based on your observations and closing activities form lesson 1 and 2.

Closure - 5 Minutes

17. Instruct students to write down one thing they have used to solve the problems today and one thing that was difficult for them today.
Model for the Projector

A bag contains 1 red cube and 8 blue cubes. Nick picks a cube from the bag.

a) What is the probability that he picks a red cube?

b) If Nick puts the cube back into the bag and picks a cube from the bag again. What is the probability that the second cube is red?

c) If Nick does not put the first cube back and picks a cube from the bag again, what is the probability that the second cube is red?
Guided Practice for the Projector

A box has 10 number cards. The cards are numbered 1 to 10. Jorge draws a card from the box.

a. What is the probability that she draws an even number?

b. What is the probability that he draws an odd number that is divisible by 3?
Real World Probability

Level 4 & 5

Eighteen students go into a classroom. 11 of them are girls. Find each probability in a fraction when the recess bell is rung.

a) The first student to come out is a girl. ___________

Explain.

b) The first student to come out is a boy. ___________

Explain.

c) If the first student to come out is a girl, find the probability that the next student to come out is boy. ___________

Explain.
Lizbeth has a spinner divided into 12 equal parts. There are 5 yellow parts, 3 green parts, and the remaining 4 parts are blue and red.

a) Draw the spinner

![ Spinner Diagram ]

b) What color is she most likely to spin? ____________
Explain.

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________

c) Jayne colored 1 of the yellow parts green. What is the likelihood she will spin red now? ________________

Does this change the color she is least likely to spin? Explain.

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
Mathematician ___________________________ Date __________

Real World Probability
Level 1-3

18 students 11 are girls

<table>
<thead>
<tr>
<th>G</th>
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<td>B</td>
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</tbody>
</table>

a) The probability the first will be a girl? __________
   Because there are ____________ girls.

b) The probability the first will be a boy? __________
   Because there are ____________ boys.

c) The 1st student is a girl. What is the probability the 2nd student is a boy? __________
   Because there are ____________  ____________.

   Boys/girls

Likelihood Word Bank

| certain | less likely | more likely | impossible | equally likely |
12 parts of a spinner:

5 yellow
3 green
4 blue
_____ red

Draw the spinner.

What color is most likely? _______________

Why?

Because there are _____ _____________

number color

If a yellow changes to green. What is the likelihood she will spin red?

__________________

<table>
<thead>
<tr>
<th>Likeliness Word Bank</th>
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</thead>
<tbody>
<tr>
<td>certain</td>
</tr>
<tr>
<td>less likely</td>
</tr>
<tr>
<td>more likely</td>
</tr>
<tr>
<td>impossible</td>
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<tr>
<td>equally likely</td>
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</tbody>
</table>
Chapter 5.6 Real-world problems: Data and Probability - Lesson 3 Day 2

Materials:
Overhead Projector/Document Camera
Transparency/or copy of pages
Markers/Pens
Modified Texts - from lessons 1 and 2
Sentence Starter Cards (made from function chart)
Activity Worksheets
Assessment Sheets.

Model - 15 minutes

1. Review the lesson objectives with students. Say, "Today we are going to be working on:

   **Content Objectives:** Solve real-world problems involving probability.

   **Language Objectives:** In small groups, students will 1) read a worksheet, 2) discuss the likeliness and the actual probability of an outcome occurring and 3) write the likeliness and actual probability of an outcome occurring

2. Say: "You will have to use all of the knowledge we have learned about outcomes and probability so far."

3. On the overhead projector, show the first problem from page 92

4. Read the problem out loud: The weather forecast in a city is that for every week, 3 days are sunny, 2 are cloudy, and 2 are rainy. On any chosen day, describe the probability of each of these outcomes.

   a) It is NOT a sunny day.

   b) It is a rainy sunny, or a cloudy day.

   c) If today is sunny, tomorrow is rainy.
5. Model how to use CUBES with the word problem.
   C - Circle the important numbers
   U - Underline the question
   B - Box the key words
   E - Eliminate the unneeded information
   S - Solve the problem

6. Draw a model of the weather, for the students, on the overhead.

7. Model how to find the probability for questions a-c.

Guided Practice - 10 minutes

8. On the overhead projector, show the 2nd problem from page 93.

9. Read the problem out loud.

10. Ask students to come up to do CUBES (see above) in front of the class. Ask: "Why are you doing this?", "How do you know to do that?"

11. Have a different student to come up and draw a model.

12. Ask students to come up to solve problems a and b.

   Guide students throughout this problem as needed.

Independent Practice - 30 minutes

13. Say: "Now it is time for you to practice these skills in groups. You will be given papers to solve similar problems to these. I will be moving around the classroom to check up on your progress. If you need help, ask your group first. I will be sure to check in with each group."

14. Students should be placed in one of 2 groups: Language Level 4-5 or Language Level 1-3. Pass the modified worksheets out accordingly. See pages 94-97.

15. Students work in cooperative groups to complete the worksheets.
16. Walk around the room to monitor students' conversations and work. As needed, become a part of their conversation; do NOT take it over. Guide students to correct answers and thinking. This is also a good time to focus on those students who need more support based on your observations and closing activities from lesson 1 and 2.

Assessment– 10 minutes

17. In small groups, students will be given worksheets, to complete to determine the probability of an outcome. See pages 95-102. These assessments are differentiated, be sure to pass out accordingly.

18. Be sure the students are given vocabulary cards from Lesson 1 and sentence frames from the functional chart based on their language levels. See the Performance Indicators Chart.
Model Question

The weather forecast in a city is that for every week, 3 days are sunny, 2 are cloudy, and 2 are rainy. On any chosen day, describe the probability of each of these outcomes.

a) It is NOT a sunny day.

b) It is a rainy sunny, or a cloudy day.

c) If today is sunny, tomorrow is rainy.
Guided Practice Question

A bag contains 15 marbles, of which 6 are red, 5 are blue, and 4 are green. Charlene draws 2 marbles from the bag.

a) If the 1st marble she draws is red, what is the likelihood that the 2nd marble is blue or red?

b) Charlene returns the 1st 2 marbles to the bag, and adds 2 more marbles. She then draws another marble from the bag. What color are the new marbles if each of the following is true?

i. The marble she draws is equally likely to be green or red.

ii. The marble she draws is most likely to be red.

iii. The marble she draws is equally likely to be green or blue.
11. 20 students are in a classroom. If students leave randomly, the probability that the first student to leave the classroom is a girl is $\frac{3}{5}$. How many girls are there?

12. A bag contains 3 red crayons, 2 blue crayons, 4 yellow crayons, and 3 green crayons. A crayon is drawn from the bag.
   a. Find the probability that the crayon is a yellow crayon.
   b. Find the probability that the crayon is a red or a green crayon.
13. A parking lot has 20 vehicles in it. There are 8 cars, 4 buses, 6 motorcycles, and 2 vans. The first vehicle that leaves the parking lot is a car. If vehicles leave randomly, what is the probability that the second vehicle to leave is a bus?

14. The mean of Susan's math and science scores is 74 points. The mean of her math and English scores is 83 points. How many more points did Susan score in English than in science?
Solve each problem by finding the probability or by describing the outcome. Show your work.

8. A bag contains 16 marbles.
   6 marbles are red, 5 are blue, 3 are green, and 2 are yellow.

Example

Sylvia draws 1 marble from the bag.
What is the probability that the marble is red?

Number of favorable outcomes = 6
Number of possible outcomes = 16

Probability of drawing a red marble = \( \frac{6}{16} = \frac{3}{8} \)

The probability that the marble is red is _______.

a. Sylvia returns the red marble to the bag. Then she draws 2 marbles from the bag, one at a time. Describe the outcome as certain, impossible, more likely, less likely, or equally likely.

i. It is ________________ that the first marble is yellow.

ii. If the first marble is green, it is ________________ that the second marble is yellow or green.

iii. If the first marble is red, it is ________________ that the second marble is red, yellow, or green.

iv. If the first marble is blue, it is ________________ that the second marble is red, blue, green, or yellow.
b. Sylvia returns the 2 marbles to the bag, and Tyron adds 1 blue marble and 3 green marbles to the bag. He then draws 1 marble from the bag. Find the probability as a fraction in simplest form.

i. What is the probability that a red marble is drawn?

Number of favorable outcomes = ________

Number of possible outcomes = 16 + 1 + 3 = ________

Probability of drawing a red marble

= ________

The probability that a red marble is drawn is ________.

ii. What is the probability that Tyron draws a red, blue, or green marble?

Number of favorable outcomes = ________

Number of possible outcomes = ________

Probability of drawing a red, blue, or green marble

= ________

The probability that Tyron draws a red, blue, or green marble is ________.
Assessment - Level 5

In a class of 25 students, 10 are girls. The names of the students are written on cards and placed in a box. The names are chosen at random to win prizes donated by a local store.

a) What is the probability that the 1\textsuperscript{st} students selected is a girl?

Explain.

b) What is the probability that the 1\textsuperscript{st} student selected is a boy?

c) If the 1\textsuperscript{st} student selected is a girl, what is the probability that the 2\textsuperscript{nd} students selected is also a girl?
Assessment - Level 4

In a class of 25 students, 10 are girls. The names of the students are written on cards and placed in a box. The names are chosen at random to win prizes donated by a local store.

a) What is the probability that the 1st students selected is a girl? Explain.

____________________

____________________

____________________

____________________

b) If the 1st student selected is a girl, what is the probability that the 2nd students selected is also a girl?

____________________

____________________

____________________

____________________
Assessment - Level 3

Use the vocabulary cards in your group to help you.

25 students are in a class. 10 are girls.

Each student has their name on a card.

Names are chosen at random to win a prize.

a) What is the probability that a girl is selected? Explain.

The probability is ____________ because there are more ____________.

b) If the first person is a girl, what is the probability of a girl the 2nd time?

The probability is ____________ because there are more ____________.
Mathematician ___________________________ Date __________

**Assessment - Level 2**

B = Boys  \( \text{G = Girls} \)  \( \text{25 students total.} \)

\[
\begin{array}{cccccccc}
\text{B} & \text{G} & \text{B} & \text{B} & \text{G} & \text{B} \\
\text{G} & \text{B} & \text{B} & \text{G} & \text{B} & \text{B} \\
\text{B} & \text{G} & \text{B} & \text{B} & \text{G} & \text{B} & \text{G} \\
\text{B} & \text{G} & \text{B} & \text{B} & \text{G} & \text{G} \\
\end{array}
\]

a) What is the probability that a girl is selected? Explain.

__________

The probability is ___________

<table>
<thead>
<tr>
<th>Likeliness Word Bank</th>
</tr>
</thead>
<tbody>
<tr>
<td>certain</td>
</tr>
</tbody>
</table>

because there are more ___________.

Boys/ girls

b) If the first person is a girl, what is the probability of a girl the 2\textsuperscript{nd} time?

__________

The probability is ___________

<table>
<thead>
<tr>
<th>Likeliness Word Bank</th>
</tr>
</thead>
<tbody>
<tr>
<td>certain</td>
</tr>
</tbody>
</table>

because there are more ___________.

Boys/ girls
Mathematician ___________________________ Date __________

Assessment - Level 2

B = Boys
G = Girls
25 students total.

<table>
<thead>
<tr>
<th>B</th>
<th>G</th>
<th>B</th>
<th>B</th>
<th>G</th>
<th>B</th>
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<td>B</td>
<td>B</td>
<td>G</td>
<td>G</td>
</tr>
</tbody>
</table>

a) What is the probability that a girl is selected?

[Blank]

<table>
<thead>
<tr>
<th>Circle</th>
</tr>
</thead>
<tbody>
<tr>
<td>certain</td>
</tr>
</tbody>
</table>

It is ________________ to pick a girl.

b) If the first person is a girl, what is the probability of a girl the 2nd time?

[Blank]

<table>
<thead>
<tr>
<th>Circle</th>
</tr>
</thead>
<tbody>
<tr>
<td>certain</td>
</tr>
</tbody>
</table>

It is ________________ to pick a girl.
5.6 Real World Probability Modification Explanation

- There are clear language objectives.
- There is a focus on building background through explicitly linked experiences from the prior lesson on likeliness vocabulary and probability.
- Key vocabulary is introduced, written, repeated, and used throughout the lesson.
- Throughout the lesson, there are clear explanations of tasks and the tasks are modeled at the beginning of each lesson.
- The lesson is scaffolded for each task.
- Students are given several opportunities to practice and use the new content knowledge.
- There are opportunities for interaction and discussion. This is done in small groups and with the teacher as she/he monitors students. Students are encouraged to use their L1 with other students during this discussion time to help them clarify and make the content more comprehensible. There are also sentence stems, and vocabulary boxes for students to utilize during discussions.
- There are ample opportunities for students to clarify key concepts during modeling, guided practice, group discussions, and teacher monitoring.
- Worksheets are modified using visuals, word banks, and answer frames to make the content more comprehensible for the students. Worksheets and other texts are given visual clues by using color for texts and pictorial representations of objects.
- The text is modified in 2 levels to make it more comprehensible for the students.
- Worksheets, texts, and assessments are modified based on students' language abilities.
- All activities for this lesson involve language skills: reading, writing, listening, and speaking.
- This lesson is modified based on the language abilities. The content does not change. All students are expected to learn the same outcome, “to determine the probability of an event by expressing it in a fraction.”
Checklists
### Grammar and Language Functions Checklist

<table>
<thead>
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<th>Grammar</th>
<th>Lesson</th>
</tr>
</thead>
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<tr>
<td>Adjectives</td>
<td>1, 2, 3</td>
</tr>
<tr>
<td>Adverbs</td>
<td>1, 3</td>
</tr>
<tr>
<td>Comparisons</td>
<td>1, 3</td>
</tr>
<tr>
<td>Descriptions</td>
<td>1</td>
</tr>
<tr>
<td>Noun</td>
<td>3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Language Functions</th>
<th>Lesson</th>
</tr>
</thead>
<tbody>
<tr>
<td>Identifying</td>
<td>1, 2, 3</td>
</tr>
<tr>
<td>Prediction</td>
<td>1, 3</td>
</tr>
<tr>
<td>Justifying</td>
<td>1, 2, 3</td>
</tr>
</tbody>
</table>
### Sheltered ELL Strategies Checklist

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<tr>
<th>SHELTERED STRATEGIES</th>
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<th>Lesson 2</th>
<th>Lesson 3</th>
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</thead>
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<td><strong>I. Contextualize Lesson</strong></td>
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<td></td>
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<tr>
<td>I.B. Develop Vocabulary</td>
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</tr>
<tr>
<td>I. C. Use extensive Visuals, Realia, Manipulatives, &amp; Gestures</td>
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<td>Pg 41, 42, 43, 49, 50, 51, 57, 58</td>
<td>Pg 80, 81, 89, 90</td>
</tr>
<tr>
<td><strong>II. Make Text Comprehensible</strong></td>
<td></td>
<td></td>
<td></td>
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<tr>
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<td>Pg 46-48, 53</td>
<td></td>
</tr>
<tr>
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<td>Pg 44-45</td>
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<tr>
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<td>Pg 80, 85-88, 89, 90</td>
</tr>
<tr>
<td>III. Make Talk Comprehensible</td>
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<tr>
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<td>Pg 81, 90</td>
</tr>
<tr>
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<td>Pg 81, 90</td>
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<td>VI. C Use Group/Pr. Work to Elicit Student Talk; Students as Researchers</td>
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<td>Pg 41, 42, 43, 49, 50, 51, 57, 58</td>
<td>Pg 80, 81, 89, 90</td>
</tr>
</tbody>
</table>
Original Lessons
**Lesson Objective**
- Decide whether an outcome is certain, more likely, equally likely, less likely, or impossible.

**Vocabulary**
- **outcome**: equally likely
- **more likely**: certain
- **less likely**: impossible

**Materials**
- bag of 35 connecting cubes (15 red, 5 yellow, and 15 blue) per pair
- Spinner/Circle (TR26) per group of three students
- Blank Table (TR10) per pair
- Blank Tally Chart (TR09) per pair
- coin per pair

**Differentiation Resources**
- Reteach 4A, pp. 119–122
- Extra Practice 4A, pp. 79–80

**Teach**

**Use Data to Predict if a Result is More Likely or Less Likely**

Students use **more likely** or **less likely** to describe the likelihood of outcomes.

- **Remind students** that when they tossed a coin in the warm-up activity, they got either a head or a tail. This result is called an outcome.

- **Ask**: Is it likely that the coin may end on its edge? (no) **Say**: Since the coin can either land heads up or tails up, there are only two possible outcomes.

- **Have students** look at the example in the Student Book. Explain that there are also only two possible outcomes in this example.

- **Point out** that since the number of blue and yellow marbles is not the same, one outcome is more likely than the other. It is more likely that a blue marble will be drawn from the bag. Reinforce the terms **outcome**, **more likely outcome**, and **less likely outcome**.
Use Data to Predict if a Result is Certain or Impossible

Students use certain or impossible to describe the likelihood of outcomes.

- Remind students that there are both blue marbles and yellow marbles in the bag, so it is likely that either a blue marble or a yellow marble will be drawn from the bag.
- Say: The yellow marbles are removed from the bag. Only blue marbles are left.
- Ask: What color marble will be drawn from the bag? (blue) Explain that since there are only blue marbles in the bag, it is certain that a blue marble will be drawn.
- Ask: Is it possible to draw a green marble? (no) Explain that since there are no green marbles, it is impossible that a green marble will be drawn.
- If time permits, guide students to reflect on and grasp the concept by showing another example. Have students think of different items to put in a bag. Then have them identify a certain outcome, an impossible outcome, or merely a likely outcome.

Use Data to Predict if Two Results are Equally Likely to Occur

Students use equally likely to describe the likelihood of outcomes.

- Explain that if there are the same number of items in a bag, the chances of drawing any of the items are the same or equal — it is equally likely that any of the items will be drawn.
- Have students look at the example. Lead them to see that since there are an equal number of yellow and blue marbles, it is equally likely that a yellow marble or a blue marble will be drawn from the bag.
- Remind students of the coin toss in the warm-up activity, and lead them to see that the two outcomes are equally likely in that example.
- If time permits, guide students to reflect on and grasp the concept by showing another example. Have students think of different items to put in a bag. Then have them identify a likely outcome and an equally likely outcome.
### Predict the Likelihood of an Outcome

**Problem of the Lesson**
Lynn plays a bean bag game at a carnival. Points are given for every bean bag that Lynn throws through the hoop. The points for each colored bean bag are shown in the table. Lynn is given a black, blue, and a green bean bag. List all the possible scores that Lynn will get if she throws two of the bean bags through the hoop.

<table>
<thead>
<tr>
<th>Color</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Black</td>
<td>10</td>
</tr>
<tr>
<td>Blue</td>
<td>5</td>
</tr>
<tr>
<td>Green</td>
<td>2</td>
</tr>
</tbody>
</table>

**Solution:**
- If the two bean bags are black and blue: $10 + 5 = 15$ points.
- If the two bean bags are black and green: $10 + 2 = 12$ points.
- If the two bean bags are blue and green: $5 + 2 = 7$ points.

**Answer:**
Lynn is likely to get 15 points, 12 points, or 7 points.

### Guided Practice
Describe the likelihood of each outcome as more likely, less likely, equally likely, certain, or impossible.

1. Look at the bags of cubes. A cube is drawn from each bag.

<table>
<thead>
<tr>
<th>Possible Outcomes</th>
<th>Green</th>
<th>Green, Yellow</th>
<th>Green, Yellow</th>
<th>Green, Yellow</th>
<th>Yellow</th>
</tr>
</thead>
</table>
| Likelihood of Picking a
Green Cube           | Certain | More likely | Less likely  | Equally likely | Impossible |

### Differentiated Instruction
**English Language Learners**
Work with the terms **more likely**, **less likely**, **certain**, and **impossible** — two terms at a time. Show students a transparent bag containing 4 red crayons and 1 blue crayon. Tell students you are going to draw one crayon from the bag without looking, and ask questions for which the answer is either **more likely** or **less likely**.

**Ask:** Is it **more likely** or **less likely** that I will draw a blue crayon? Repeat with questions for which the answers are **certain** or **impossible**. Finally, have students describe sets of crayons that have outcomes that are **equally likely**.

### Best Practices
Take the opportunity to have students identify outcomes throughout the day. For example, have students describe the possible outcomes when they are about to reach into their desks to take out a book, reach into a box to get a crayon, or when you are about to choose a student to answer a question.
Lesson Objective

- Decide whether an outcome is certain, more likely, equally likely, less likely, or impossible.

Vocabulary
outcomes equally likely
certain less likely
more likely impossible

Learn Use data to predict if a result is more likely or less likely.

A bag contains 7 blue marbles and 2 yellow marbles.

When a marble is drawn from the bag, the result is called an outcome.
If a blue marble is drawn, the outcome is a blue marble. If a yellow marble is drawn, the outcome is a yellow marble.

Only a blue or a yellow marble can be drawn from the bag. So there are only two possible outcomes.

Since there are more blue marbles than yellow marbles, you are more likely to pick a blue marble than a yellow marble.

Because there are only two yellow marbles, you are less likely to pick a yellow marble.
Use data to predict if a result is certain or impossible.

2 yellow marbles are removed from the bag.

Since there are only blue marbles left in the bag, it is **certain** that a blue marble will be drawn.

Since there are no yellow marbles left in the bag, it is **impossible** to pick a yellow marble.

Use data to predict if two results are equally likely to occur.

The bag contains 5 blue marbles and 5 yellow marbles.

The number of blue marbles is the same as the number of yellow marbles.

Since there are an equal number of blue and yellow marbles, it is **equally likely** that the outcome will be a blue marble or a yellow marble.
Predict the likelihood of an outcome.

Each spinner is spun once. Find the possible outcomes for each spinner, and the likelihood of landing on blue.

<table>
<thead>
<tr>
<th>Possible Outcomes</th>
<th>Blue</th>
<th>Blue, Yellow</th>
<th>Blue, Purple</th>
<th>Yellow, Purple</th>
</tr>
</thead>
<tbody>
<tr>
<td>Likelihood of Landing on Blue</td>
<td>Certain</td>
<td>Equally likely</td>
<td>Less likely</td>
<td>Impossible</td>
</tr>
</tbody>
</table>

Guided Practice

Describe the likelihood of each outcome as more likely, less likely, equally likely, certain, or impossible.

1. Look at the bags of cubes. A cube is drawn from each bag.

<table>
<thead>
<tr>
<th>Possible Outcomes</th>
<th>Green</th>
<th>Green, Yellow</th>
<th>Green, Yellow</th>
<th>Green, Yellow</th>
<th>Yellow</th>
</tr>
</thead>
<tbody>
<tr>
<td>Likelihood of Picking a Green Cube</td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>
Chapter 5

5.5 Probability as a Fraction

LESSON OBJECTIVES

• Determine the probability of an event.
• Express probability as a fraction.

TECHNOLOGY RESOURCES

• Math in Focus eBooks
• Math in Focus Teacher Resources CD
• Math in Focus Virtual Manipulatives

Vocabulary

favorable outcome, probability

DAY 1

Student Book 4A, pp. 198–203
Workbook 4A, pp. 115–118

MATERIALS

• bag of 10 connecting cubes per pair
• 20 Blank Cards (TR27) and 4 markers or crayons per pair
• Blank Tally Chart (TR09) per pair

DIFFERENTIATION RESOURCES

• Reteach 4A, pp. 123–128
• Extra Practice 4A, pp. 81–84

5-minute Warm Up

Students work in pairs. Give each pair a bag of 10 connecting cubes of 3 different colors. Students take turns drawing cubes from the bag and recording their results. Have them predict the likelihood of each outcome, by stating whether it is more likely or less likely. This activity prepares students for finding probabilities.

Lesson 2

5.5 Probability as a Fraction

Lesson Objectives

• Determine the probability of an event.
• Express probability as a fraction.

Vocabulary

favorable outcome, probability

Step 1

Express the likelihood of an outcome as a fraction.

The spinner has 6 equal parts. When the spinner is spun once, there are 6 possible outcomes. The likelihood of landing on any 1 of the 6 outcomes is equal. So, the chance of getting any 1 of the numbers is 1 out of 6, or $\frac{1}{6}$.

A favorable outcome is a result you are looking for.

If you are hoping to land on 5, then 5 is the favorable outcome.

The likelihood or probability of getting a favorable outcome can be written as a fraction.

Probability of a favorable outcome = $\frac{\text{Number of favorable outcomes}}{\text{Total number of possible outcomes}}$

Likelihood or probability of landing on 5 = $\frac{1}{6}$

DAY 1

Teach

Express the Likelihood of an Outcome as a Fraction (pages 198 and 199)

Students determine the probability of an event and express it as a fraction.

• Have students read the explanation in the Student Book.

Explain the meaning of the terms favorable outcome and possible outcomes.

• Have students make a list to show the favorable outcomes and all the possible outcomes, and count the number for each. For example, to obtain a 5, the number of favorable outcomes is 1. The possible outcomes are 1, 2, 3, 4, 5, and 6. So, the total number of possible outcomes is 6.

• Explain that the favorable outcome can be expressed as a fraction of the total number of possible outcomes. So, the probability of the favorable outcome is $\frac{1}{6}$.
For the second example, the list of numbers less than 4 is 1, 2, and 3. There are 3 favorable outcomes. The probability of the favorable outcome is $\frac{3}{6} = \frac{1}{2}$.

Check for Understanding

Guided Practice (pages 199 and 200)

1 and 2 Review finding the probability of an outcome and expressing it as a fraction. Lead students to identify and make a list of the favorable outcomes in each question. Then have them answer the questions using the formula for probability.

For Struggling Learners Give pairs of students some different colored connecting cubes and a bag. Have students model these situations to find the missing numbers.

a. 3 red, 7 blue, 4 yellow;
   Probability of yellow = $\frac{4}{14}$
   (Answer: 1 blue)

b. 7 red, 2 blue, 4 yellow;
   Probability of yellow = $\frac{4}{13}$
   (Answer: 6 red)

Let's Explore!

Do a Probability Experiment Using Cards (page 200)

This exploration reinforces the concepts of possible outcomes and favorable outcomes.

- Have students work in pairs. Explain the instructions in the Student Book.
- Invite several students to give examples of favorable outcomes, for example, picking a card that shows a number greater than 5, or picking a card that is part of the word 'BIG'. See Additional Answers, page T61.
Represent Probability on a Number Line.

A weather channel forecasted stormy weather on the weekend of an outdoor carnival.

The probability of stormy weather was \( \frac{3}{4} \).

When you write probability as a fraction, the closer the probability of an outcome is to 1, the more likely the outcome is to occur.

Guided Practice

Find each probability as a fraction on the number line. Then describe the likelihood of each outcome as certain, impossible, less likely, more likely, or equally likely.

A bag contains 2 red cubes, 3 yellow cubes, and 3 blue cubes. Find each probability below when you pick one cube from the bag.

1. Probability of drawing a green cube = \( \frac{0}{3} \); impossible
2. Probability of drawing a yellow cube = \( \frac{3}{6} \); less likely
3. Probability of drawing a red or yellow cube = \( \frac{5}{6} \); more likely
4. Probability of drawing a red, yellow, or blue cube = \( \frac{1}{1} \); certain

Problem of the Lesson

Seth plays a ball game at a carnival. Points are given for every ball that Seth throws through the hoop. The points for each color of ball are shown in the table. Seth is given only one ball of each color. Find the probability of Seth scoring less than 10 points on his throw.

Black ball - 10 points
Blue ball - 5 points
Green ball - 2 points

Solution:
Possible outcomes: 10 points (black ball), 5 points (blue ball), 2 points (green ball) or 0 points (a miss).

Since there are 4 possible outcomes, and 2 of them are favorable outcomes (less than 10 points), the probability of Seth scoring less than 10 points is \( \frac{1}{2} \).

Answer:

Differentiated Instruction

English Language Learners

Some students may think that favorable outcomes are outcomes that they may want or like better. Explain that a favorable outcome is any outcome for which they are asked to find the probability.

Best Practices

You may wish to display several large number lines (similar to those on this page) on the board. Show number lines for fractions with various denominators. Students can refer to the number lines as they work through the rest of this lesson.

Guided Practice

Have students plot the probability of each outcome on the number line. Then have them answer the questions.
Lesson Objectives

- Determine the probability of an event.
- Express probability as a fraction.

Express the likelihood of an outcome as a fraction.

The spinner has 6 equal parts. When the spinner is spun once, there are 6 possible outcomes. The likelihood of landing on any 1 of the 6 outcomes is equal. So, the chance of getting any 1 of the numbers is 1 out of 6, or $\frac{1}{6}$.

A **favorable outcome** is a result you are looking for. If you are hoping to land on 5, then 5 is the favorable outcome.

The likelihood or **probability** of getting a favorable outcome can be written as a fraction.

$$\text{Probability of a favorable outcome} = \frac{\text{Number of favorable outcomes}}{\text{Total number of possible outcomes}}$$

Likelihood or probability of landing on 5 = $\frac{1}{6}$
Joe wants to land on a number less than 4. His favorable outcomes are 1, 2, and 3.

There are 3 favorable outcomes out of 6 possible outcomes.

Probability of landing on a number less than 4 = \( \frac{\text{Number of favorable outcomes}}{\text{Number of possible outcomes}} \)

\[ = \frac{3}{6} = \frac{1}{2} \]

Express the fraction in simplest form.

Guided Practice

Solve.

Elena made a spinner with 8 equal parts. She labeled each part from 1 to 8.

How many even numbers are there? Find the probability of landing on an even number when you spin the spinner once.

There are \( \boxed{4} \) even numbers.

The probability of landing on an even number is \( \boxed{\frac{1}{2}} \).
Represent probability on a number line.

A weather channel forecasted stormy weather on the weekend of an outdoor carnival.
The probability of stormy weather was \( \frac{7}{8} \).

The probability of rain is more likely because \( \frac{7}{8} \) is closer to 1 on the number line.

When you write probability as a fraction, the closer the probability of an outcome is to 1, the more likely the outcome is to occur.

Guided Practice

Find each probability as a fraction on the number line. Then describe the likelihood of each outcome as certain, impossible, less likely, more likely, or equally likely.

A bag contains 2 red cubes, 3 yellow cubes, and 3 blue cubes. Find each probability below when you pick one cube from the bag.

3. Probability of drawing a green cube = \[ \frac{0}{8} \]
4. Probability of drawing a yellow cube = \[ \frac{3}{8} \]
5. Probability of drawing a red or yellow cube = \[ \frac{5}{8} \]
6. Probability of drawing a red, yellow, or blue cube = \[ \frac{6}{8} \]
Lesson Objective
- Solve real-world problems involving probability and measures of central tendency.

Solve problems using the mean.
The mean weight of 2 tables is 12 pounds. The weight of one of the tables is 12 pounds. What is the weight of the other table?

\[
\begin{align*}
2 \times 12 & = 24 \text{ lb} \\
7 + 12 & = 19 \text{ lb} \\
\text{Total weight of the 2 tables} & = 19 \text{ lb} \\
\text{Weight of the other table} & = 20 \text{ lb}
\end{align*}
\]

The weight of the other table is 20 pounds.

Guided Practice
Solve. Show your work.
1. Mr. Soso bought chicken, fish, and shrimp at a market. The mean weight of the 3 items was 7 pounds. The weight of chicken was 8 pounds, and the weight of fish was 4 pounds. What was the weight of shrimp that Mr. Soso bought?

\[
\begin{align*}
\text{Total weight of chicken and fish} & = 12 \text{ lb} \\
\text{Weight of shrimp} & = 16 \text{ lb} \\
\text{Mr. Soso bought} & = 8 + 4 = 12 \text{ pounds}
\end{align*}
\]

Teach

Solve Problems Using the Mean (page 204)
Students apply the concept of mean or average to solve real-world problems.
- Have students read the problem in the Student Book.
- Draw and explain the bar model.
- Step 1: Draw one bar. Divide it into two parts to represent the two tables. One part is longer than the other as they do not represent the same weight.
- Step 2: Fill in the given information. The average weight is 16 pounds. This means the total weight (whole bar) is 16 \times 2 = 32 pounds. Label the whole `32 pounds`
- Then label one part `12 pounds`.
- Step 3: Ask: What do you want to find? (the weight of the other table) Put a question mark for the other part.

Check for Understanding
✓ Guided Practice (pages 204 and 205)
1. Explain that this exercise is similar to the earlier example. Here there are three items instead of two. However, the method of solving the problem is the same.
Solve Problems to Find the Mean, Median, Mode, and Range (page 206)

Students find the mean, median, mode, and range in a real-world problem.

- Review the general formulas for finding mean, median, mode, and range of a set of data.
- Have students read the problem in the Student Book.
- Then solve the problem one part at a time, even though the Learn box reveals the whole solution.
- Point out that in Exercise 3, the formula to find the range is manipulated to find the least number, given the range and the greatest number.

Guided Practice (page 207)

4. Students work in pairs to apply the skills learned earlier. Remind students that in Exercise 4, the Xs represent the number of pumpkins of each weight. Hence, they need to multiply the number of Xs on the line plot by the price, and not the weight of the pumpkins by the price.
There are 100 gifts. 5 of the gifts are books. What are Mario's chances of picking a book?

Solution:
Number of favorable outcomes = 5
Total number of possible outcomes = 100
Probability = \( \frac{5}{100} \) = \( \frac{1}{20} \)

Answer: \( \frac{1}{20} \)

2 and 3 Have students work in pairs. Briefly explain the procedure to solve the problems, then have students go through the problems. Explain the use of the 'comparison model' in the solution to Exercise 3.

Best Practices 3 Divide students into small groups. Teach each Learn section to the class as a whole. Have groups work together to complete each Guided Practice. Select a different group each time to share and explain to the class how they arrived at their answers.
Lesson Objective
• Solve real-world problems involving probability and measures of central tendency.

Learn Solve problems using the mean.
The mean weight of 2 tables is 16 pounds. The weight of one of the tables is 12 pounds. What is the weight of the other table?

\[ 2 \times 16 \text{ lb} = 32 \text{ lb} \]

Total weight of the 2 tables \( = 16 \times 2 \)
\( = 32 \text{ lb} \)

Weight of the other table \( = 32 - 12 \)
\( = 20 \text{ lb} \)

The weight of the other table is 20 pounds.

Guided Practice
Solve. Show your work.

1 Mr. Saco bought chicken, fish, and shrimp at a market. The mean weight of the 3 items was 7 pounds. The weight of chicken was 8 pounds and the weight of fish was 4 pounds. What was the weight of shrimp that Mr. Saco bought?

Total weight of chicken, fish, and shrimp Mr. Saco bought \( = \) \[ \Box \times \Box \] pounds

Weight of chicken and fish Mr. Saco bought \( = \) \[ \Box + \Box \] pounds
Weight of shrimp Mr. Saco bought = \[\text{Weight} - \text{Weight}\] = \[\text{pounds}\]

Mr. Saco bought \[\text{pounds}\] of shrimp.

2. Kitty bought 20 books at a book fair. The mean cost of 15 of the books was $12. The total cost of the other 5 books was $40. Find the mean cost of the 20 books.

Total cost of the 15 books = \[\text{Cost} \times \text{Number}\] = \[\text{Total Cost}\]

Total cost of the 20 books = \[\text{Cost} + \text{Cost}\] = \[\text{Total Cost}\]

Mean cost of the 20 books = \[\text{Cost} \div \text{Number}\] = \[\text{Mean Cost}\]

The mean cost of the 20 books was \[\text{Cost}\].

3. The mean weight of a chicken and a duck is 5 pounds. The duck is 2 pounds heavier than the chicken. Find the weight of the duck.

Total weight of the chicken and duck = \[\text{Weight} \times \text{Number}\] = \[\text{Total Weight}\] lb

Chicken

Duck

2 units \[\text{Weight} - \text{Weight}\] = \[\text{Weight}\] lb
1 unit \[\text{Weight} \div \text{Number}\] = \[\text{Weight}\] lb
\[\text{Weight} + \text{Weight}\] = \[\text{Weight}\] lb

The weight of the duck is \[\text{pounds}\].
Learn Solve problems to find the mean, median, mode, and range.

Jake and five friends went on a trip, and collected 432 rocks altogether. Two of his friends did not count the individual number of rocks they collected. The data that was recorded is shown below.

85  78  93  52  ?  ?

1 Find the mean number of rocks they collected.

Mean = \(\frac{432}{6}\)

= 72

The mean number of rocks they collected is 72.

2 The greatest number of rocks collected is 93, and the range is 47. What is the least number of rocks collected?

Range = Greatest Number – Least Number

47 = 93 – ?

93 - 47 = 46

The least number of rocks collected is 46.

3 Find the mode of the set of data.

85 78 93 52 46 ?

To find the mode, first find the unknown item of data.

432 – 85 – 78 – 93 – 52 – 46 = 78

46 52 78 78 85 93

The mode of the set of data is 78.

4 Find the median of the set of data.

Arrange the numbers in order, from least to greatest.

46 52 78 78 85 93

The median of the set of data is 78.