Data and Probability

Unit 13 Overview: 8 lessons

Students measure lengths to the nearest eighth of an inch and show them on line plots marked in halves, quarters and eighths, then add and subtract fractions to answer questions about the data. These two lessons can also close Unit 8 instead, right after adding and subtracting fractions. The rest of the unit is taught in 4th grade in some states: collecting data in a frequency table, stem-and-leaf plots with the mode, median and range, bar graphs whose scales count by halves, line graphs, the possible outcomes of an event and how likely it is, and probability as a fraction from 0 to 1.

THE UNIT, DAY BY DAY

Day 1	**Pre-Check**	What students already know, before the first lesson.
Day 2	**13.1** Make a line plot in eighths	I can make a line plot of lengths in halves, quarters and eighths.
Day 3	**13.2** Solve problems with a line plot	I can add and subtract fractions with a line plot.
Day 4	**13.3** Frequency tables ★	I can collect data and show it in a frequency table.
Day 5	**13.4** Stem-and-leaf plots ★	I can make and read a stem-and-leaf plot.
Day 6	**13.5** Scaled bar graphs ★	I can read a bar graph whose scale counts by halves.
Day 7	**13.6** Line graphs ★	I can read a line graph and tell how the data changes.
Day 8	**13.7** Outcomes and how likely ★	I can list the outcomes and tell how likely an event is.
Day 9	**13.8** Probability as a fraction ★	I can write a probability as a fraction from 0 to 1.
Day 10	**Unit Review**	The review, to go over together.
Day 11	**Unit Test**	Form A; Form B (other numbers) is for a retest.

★ Taught in 4th grade in some states. Skip these lessons if yours teaches them in another grade; animalmath.com/standards shows your state's list.

GET READY FOR THE UNIT

- Rulers marked in eighths of an inch, and paper strips and pencils to measure
- Sticky notes for class line plots and graphs
- Grid paper (the Graph Paper maker prints it), rulers and colored pencils
- For the state lessons: clipboards, spinners with a paper clip, number cubes, a coin and bags of colored cubes or marbles

HOW EACH LESSON GOES

1. **Warm up** (5 min)
2. **Teach** (10 min)
3. **Try it together** (10 min)
4. **Practice** (15 min)
5. **Exit ticket** (5 min): a quick check on the lesson.

Each lesson page ends with the Animal Math sheets, makers, tools and quizzes for it. "Sheet 3" is the third worksheet of a pack; a color pack prints each sheet again in black and white.

CHECKING AS YOU GO

PRINTABLE **Pre-Check**: Day 1, with a key

PRINTABLE **Unit Review**: the day before the test

EXIT TICKET **Exit Tickets**: one a lesson, two to a page

PRINTABLE **Unit Test**: Forms A and B, with keys

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Lesson 13.1: Make a line plot in eighths

GOAL Students measure lengths to the nearest eighth of an inch, see halves and quarters as eighths, and show the lengths on a line plot marked in eighths, one X for each length.

I can make a line plot of lengths in halves, quarters and eighths.

About 45 minutes

THE LESSON

1. **Warm up** (5 min) Fold a paper strip in half three times and open it: 8 equal parts. Find 1/4, 1/2 and 3/4 among the eighths: 2/8, 4/8 and 6/8.
2. **Teach** (10 min) Show a table of 8 pencil lengths: 6 1/4, 6 1/2, 6 3/8, 6 1/2, 7, 6 7/8, 6 1/2 and 6 3/4 inches. Draw a line from 6 to 7 with 8 equal spaces and label the marks in eighths. Find each length (6 1/4 is 6 2/8, two marks past 6) and put an X above it, stacking the Xs for lengths that repeat. Count them: 8 Xs, one for each pencil.

   > **Say:** "Every length gets one X. A quarter is two eighths and a half is four eighths, so every length has a mark."

3. **Try it together** (10 min) Partners measure 4 paper strips to the nearest eighth inch and add a sticky note X for each to a class line plot. Count the Xs to check that every strip is there.
4. **Practice** (15 min) Students read line plots on sheet 1 of Line Plots with Fractions, make them from tables on sheet 2, and measure ribbons and plot them on sheet 3.
5. **Exit ticket** (5 min) Students do **Exit Ticket 13.1** and circle a face beside the "I can" line. On question 1, look for 1/8, 3/8 and 5/8 under the marks and Xs at 1/8, 3/8 (two), 1/2 and 3/4 (two); an X for 3/4 at 3/8 means the bottom number was not read. On question 2, look for 2; 3 counts the 1/2 as longer.

Need help? Start with the quarter inch line plot on sheet 5 of Measuring to the Half and Quarter Inch.

Ready for more? Measure 6 things in the room to the nearest eighth inch and plot them.

GET READY

- Rulers marked in eighths of an inch
- Paper strips cut to lengths between 6 and 7 inches
- Sticky notes for a class line plot

WORDS TO USE

line plot: a number line with an X for each measurement

eighth inch: one of 8 equal spaces in an inch

data: the numbers we collect

ASK

- Where does 6 1/4 go on a line in eighths?
- Why do two Xs go above one mark?
- How many Xs should there be?

WATCH FOR

Puts 1/4 at the first mark after the whole number. Count the spaces: the first mark is 1/8, and 1/4 is two eighths.

Draws one X for a length that comes twice. Cross each length off the table as its X goes on.

Measures to the nearest quarter. Count the spaces between two whole inches: 8, so each is 1/8.

ON ANIMAL MATH

- PRINTABLE — **Line Plots with Fractions**: sheets 1-3
- PRINTABLE — **Measuring to the Half and Quarter Inch**: sheet 5, a step back
- TOOL — **Measuring Tool**: Measure With Inch Ruler, Ruler Marks Every Mark (quarter inches)
- QUIZ — **Graphs and Data Quiz**: the Line Plots level
- EXIT TICKET — **4th Grade Data and Probability Exit Tickets**: Exit Ticket 13.1

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Lesson 13.2: Solve problems with a line plot

GOAL Students use the data on a line plot to answer questions: they subtract to find how much longer the longest is than the shortest, and add to find a total, writing halves and quarters as eighths first.

I can add and subtract fractions with a line plot.

About 45 minutes

THE LESSON

1. **Warm up** (5 min) On whiteboards: 3/8 + 2/8, 7/8 – 4/8, then 1/4 + 3/8, writing 1/4 as 2/8 first.
2. **Teach** (10 min) Show the pencil line plot. How much longer is the longest pencil than the shortest? 7 – 6 1/4: count the eighths from 6 2/8 up to 7, six of them, so 6/8 or 3/4 inch. The two longest together: 7 + 6 7/8 = 13 7/8 inches. The three 6 1/2 inch pencils: 6 4/8 + 6 4/8 + 6 4/8 = 18 12/8, or 19 4/8 inches.

   > **Say:** "I find the lengths I need on the plot, write them in eighths, then add or subtract."

3. **Try it together** (10 min) Show snow on 7 days: 1/4, 3/8, 3/8, 3/8, 1/2, 5/8 and 1 1/8 inches. Partners find how much more fell on the snowiest day than the least snowy (7/8 inch) and the total on the 3/8 inch days (1 1/8 inches).
4. **Practice** (15 min) Students add and subtract on sheet 4 of Line Plots with Fractions and sheet 5 of Adding and Subtracting Fractions. Early finishers find the totals on sheet 5 of Line Plots with Fractions; sharing them equally is 5th grade.
5. **Exit ticket** (5 min) Students do **Exit Ticket 13.2** and circle a face beside the "I can" line. On question 1, look for 5/8 inch (7/8 – 2/8); 6/8 reads 1/4 as 1/8, and 6/4 subtracts the bottom numbers too. On question 2, look for 1 5/8 inches (13/8 is the same; ask for a mixed number); 13/16 or 10/12 adds the bottom numbers.

Need help? Count jumps of 1/8 along the plot with a finger, from the shortest length to the longest.

Ready for more? Find the total length of all 8 pencils on the class plot.

GET READY

- The class pencil line plot from lesson 13.1
- A line plot of snow on chart paper
- Strips folded in eighths

WORDS TO USE

difference: how much more one amount is than another: subtract

total: all the amounts added together

like fractions: fractions with the same bottom number, like eighths

ASK

- Which lengths on the plot do you need?
- Do you add or subtract? How do you know?
- How can you write 1/2 and 3/4 so every part is an eighth?

WATCH FOR

Adds the bottom numbers: 3/8 + 3/8 = 6/16. Lay two strips of eighths end to end: the parts stay eighths.

Subtracts with the tallest stack, not the ends. Circle the longest and the shortest first: they are at the ends.

Leaves out an X in a stack. Tick each X as it is used.

ON ANIMAL MATH

- PRINTABLE **Line Plots with Fractions**: sheet 4, and sheet 5 for early finishers
- PRINTABLE **Adding and Subtracting Fractions**: sheet 5
- QUIZ **Fraction Operations Quiz**: the Add and Subtract level
- EXIT TICKET **4th Grade Data and Probability Exit Tickets**: Exit Ticket 13.2

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Lesson 13.3: Frequency tables

GOAL Students tell a question that needs data from one with a single answer, choose how to collect the data (ask, watch, measure or test), and tally number data into a frequency table with a title, labels and a total.

I can collect data and show it in a frequency table.

About 45 minutes

★ Taught in 4th grade in some states

THE LESSON

1. **Warm up** (5 min) Ask which question needs data from many people: How many pockets are on your clothes today? How many legs does an ant have?
2. **Teach** (10 min) Collect pocket answers from 14 students: 2, 4, 0, 2, 3, 2, 4, 1, 2, 0, 3, 2, 4, 2. Make a table with Number of Pockets, Tally and Frequency columns and a row for each number from 0 to 4. Cross off each answer as you tally it, then count the rows: 2, 1, 6, 2 and 3. They add up to 14, one for each student. Give the table a title.

   > **Say:** "I cross off each answer as I tally it, and the frequencies must add up to the number of answers."

3. **Try it together** (10 min) The class picks a question with number answers, like How many books are in your desk? Partners collect the answers, make the table with a title and labels, and check the total.
4. **Practice** (15 min) Students sort questions and ways to collect data on sheet 1 of Frequency Tables and Stem-and-Leaf Plots and tally data on sheets 2 and 3. Early finishers do questions 1 to 7 on sheet 5 of Line Graphs.
5. **Exit ticket** (5 min) Students do **Exit Ticket 13.3** and circle a face beside the "I can" line. On question 1, look for 2, 6 and 4, a total of 12; 11 or 13 means an answer was missed or tallied twice. On question 2, look for the buttons question; inches in a foot has one answer.

Need help? Start with the class survey on sheet 3 of Survey Questions and Data Collection.

Ready for more? Collect data at home for a question of your own and bring back its frequency table.

GET READY

- A blank frequency table on chart paper
- Clipboards for collecting answers
- Question cards to sort

WORDS TO USE

survey: asking a group of people the same question

tally mark: one line for each answer; the fifth crosses the four

frequency: how many times a value comes up

ASK

- Does this question have one answer, or does it need data?
- Would you ask, watch, measure or test to get the data?
- How can you check that every answer is in the table?

WATCH FOR

Makes rows only for the answers that came up. List every value from least to greatest, even one with a frequency of 0.

Draws five lines in a row for 5. The fifth tally crosses the other four.

Tallies an answer twice. Cross off each answer as it is tallied.

ON ANIMAL MATH

- PRINTABLE **Frequency Tables and Stem-and-Leaf Plots**: sheets 1-3
- PRINTABLE **Survey Questions and Data Collection**: sheets 3-4, a step back
- PRINTABLE **Line Graphs**: sheet 5, questions 1 to 7
- EXIT TICKET **4th Grade Data and Probability Exit Tickets**: Exit Ticket 13.3

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Lesson 13.4: Stem-and-leaf plots

GOAL Students make a stem-and-leaf plot with the leaves in order and a key, then use it to find the mode (the value that comes up most), the median (the middle value) and the range (the greatest minus the least).

I can make and read a stem-and-leaf plot.

About 45 minutes

★ Taught in 4th grade in some states

THE LESSON

1. **Warm up** (5 min) Write 47 and ask which digit is the tens and which is the ones. Then line up 7 students holding number cards from least to greatest and find who stands in the middle.
2. **Teach** (10 min) Show the heights of 9 bean plants in centimeters: 26, 41, 33, 48, 26, 35, 54, 26, 39. Write the stems 2, 3, 4 and 5 down the left of a line. Put each ones digit beside its stem, then write the leaves in order: 2 | 6 6 6, 3 | 3 5 9, 4 | 1 8, 5 | 4. Add a key: 3 | 5 means 35. Now read it: the mode is 26 (three times), the median is the 5th of the 9 values, 35, and the range is 54 – 26 = 28.

   > **Say:** "The stem is the tens and the leaf is the ones. With the leaves in order, the plot puts the data in order for me."
3. **Try it together** (10 min) Partners make a plot of 11 spring high temperatures: 63, 45, 71, 58, 45, 80, 66, 45, 52, 74, 69, and find the mode (45), the median (63) and the range (35). Why is the median not the 6th number as written?
4. **Practice** (15 min) Students make stem-and-leaf plots on sheet 4 of Frequency Tables and Stem-and-Leaf Plots and find the mode, median and range on sheet 5. Early finishers do sheets 3 and 5 of Mean, Median, Mode and Range.
5. **Exit ticket** (5 min) Students do **Exit Ticket 13.4** and circle a face beside the "I can" line. On question 1, look for 1 | 6 6 6, 2 | 2 4 7 and 3 | 1 5 9, every row in order. On question 2, look for a mode of 16, a median of 24 and a range of 23; a median of 35 is the middle of the list as written, and a range of 39 is the greatest value.

Need help? Write each number on a card, sort the cards into rows by their tens, then copy the rows as stems and leaves.

Ready for more? Change one bean plant height so the median changes but the mode stays the same.

GET READY

- The bean plant heights on chart paper
- Index cards with one number each, for lining up
- Whiteboards and markers

WORDS TO USE

stem: the tens digit of each number

leaf: the ones digit, written beside its stem

median: the middle value when the data is in order

mode and range: the value that comes up most; the greatest minus the least

ASK

- Which digit is the stem? Which is the leaf?
- Are the leaves in order? Why does it matter?
- How many values are there? Which one is in the middle?

WATCH FOR

Finds the median from leaves that are not in order. Rewrite each row in order before finding the middle.

Writes a stem again for every value. Each stem is written once; every value with that tens digit is a leaf on its row.

Gives the greatest value as the range. The range is a difference: the greatest minus the least.

ON ANIMAL MATH

PRINTABLE **Frequency Tables and Stem-and-Leaf Plots**: sheets 4-5

PRINTABLE **Mean, Median, Mode and Range**: sheets 3 and 5, for early finishers

EXIT TICKET **4th Grade Data and Probability Exit Tickets**: Exit Ticket 13.4

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Lesson 13.5: Scaled bar graphs

GOAL Students read and draw bar graphs whose scales count by halves, by 0.5 or by 10s, read a bar that ends halfway between two lines, and add and subtract the data.

I can read a bar graph whose scale counts by halves.

About 45 minutes

★ Taught in 4th grade in some states

THE LESSON

1. **Warm up** (5 min) Count together by halves from 0 to 5, then by 10s; ask what is halfway between 60 and 70.
2. **Teach** (10 min) Show a bar graph of the cups of water four plants got in a week, its scale counting by halves: fern 3 1/2, cactus 1/2, ivy 2 and mint 4. Read the scale first: each line is 1/2 cup. Read each bar with a ruler laid across from its end. How much more did the mint get than the ivy? 4 – 2 = 2 cups. The fern and the cactus together? 3 1/2 + 1/2 = 4 cups.

   > **Say:** "I read the scale first: what is each line worth? Then I read across from the end of each bar."

3. **Try it together** (10 min) Partners graph snow on four days, 1 1/2, 3, 1/2 and 2 1/2 inches, with a scale of halves, then write a how much more question and a how much in all question for another pair.
4. **Practice** (15 min) Students read a graph that counts by 100s on sheet 4 of Scaled Bar Graphs and choose a scale and draw the bars on sheet 5, then finish double bar graphs, one with a decimal scale, on sheet 4 of Line Graphs. The Bar Graphs maker prints more, with bars that can end halfway between the 10s.
5. **Exit ticket** (5 min) Students do **Exit Ticket 13.5** and circle a face beside the "I can" line. On question 1, look for 3 1/2, 1 1/2 and 2; 7, 3 and 4 count each line as 1. On question 2, look for 1 1/2 miles: 3 1/2 – 2.

Need help? Write the scale number beside every line of the graph before reading the bars.

Ready for more? Draw the snow graph again with a scale that counts by 1s, and tell which scale makes it easier to read.

GET READY

- A bar graph on chart paper with a scale that counts by halves
- Grid paper and colored pencils
- Rulers to read across from the end of a bar

WORDS TO USE

scale: the numbers along a graph that tell what each line is worth

interval: the jump from one line to the next, like 1/2 or 10

halfway: a bar that ends between two lines: half of the jump more

ASK

- What is each line on the scale worth?
- Where does a bar end if it is halfway between two lines?
- How much more? Do you add or subtract?

WATCH FOR

Counts each line as 1. Read the scale out loud, by halves, before reading any bar.

Reads a bar that ends halfway as the next whole number. Lay a ruler across from the end of the bar and read where it meets the scale.

Draws a bar to the wrong line. Find the value on the scale first.

ON ANIMAL MATH

- PRINTABLE **Scaled Bar Graphs**: sheets 4-5, a review
- PRINTABLE **Line Graphs**: sheet 4
- MAKER **Bar Graphs**: Activity Read the Graph, Scale Count by 10s, Max Value on Axis 100, Questions per Graph 5
- QUIZ **Graphs and Data Quiz**: the Scaled Graphs level
- EXIT TICKET **4th Grade Data and Probability Exit Tickets**: Exit Ticket 13.5

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Lesson 13.6: Line graphs

GOAL Students read a line graph that shows how data changes over time: they read its points, tell when the data went up, went down or stayed the same, find how much it changed, and draw a line graph from a table.

I can read a line graph and tell how the data changes.

About 45 minutes

★ Taught in 4th grade in some states

THE LESSON

1. **Warm up** (5 min) Ask how the temperature changes from early morning to the afternoon, and then to the evening. Students trace it in the air with a finger: up, then down.
2. **Teach** (10 min) Show a line graph of the temperature on one day: 50° at 6 a.m., 58° at 9 a.m., 66° at noon, 70° at 3 p.m. and 62° at 6 p.m. Read the scale (each line is 2 degrees), then each point. When was it warmest? At 3 p.m. How much did it rise from 6 a.m. to noon? 66 – 50 = 16 degrees. When did it fall? From 3 p.m. to 6 p.m., where the line slopes down. A steeper piece of the line is a bigger change.

   > **Say:** "Each point is one reading. A line going up is an increase, going down is a decrease, and a flat line means no change."

3. **Try it together** (10 min) Partners draw a line graph of a puppy's weight from the table: 8, 11, 14, 14, 16 and 19 pounds for six months. They choose a scale, plot and join the points, then tell when the weight stayed the same and how much the puppy gained in all (11 pounds).
4. **Practice** (15 min) Students read the line graphs on sheet 1 of Line Graphs and make their own from tables on sheet 2. Early finishers read the graphs with fraction and decimal scales on sheet 3.
5. **Exit ticket** (5 min) Students do **Exit Ticket 13.6** and circle a face beside the "I can" line. On question 1, look for 20 cans, Friday's 30 take away Monday's 10; 30 means only Friday was read. On question 2, look for Wednesday to Thursday, where the line goes down; Thursday alone is close, so ask between which two days.

Need help? Lay a ruler across from each point to the scale, and write each value beside its point.

Ready for more? Predict the puppy's weight next month, and explain how the graph helped.

GET READY

- A line graph of one day's temperatures on chart paper
- Grid paper and rulers
- A table of a puppy's weight for six months

WORDS TO USE

line graph: points joined by lines to show how something changes over time

increase: goes up from one point to the next

decrease: goes down from one point to the next

ASK

- What is each line on the scale worth?
- Where does the line go up? Down? Stay flat?
- How much did it change between these two points?

WATCH FOR

Reads the scale as counting by 1s. Say the scale numbers out loud before reading a point.

Names one day for a change. A change happens between two points: say from when to when.

Joins the points out of order. Plot the points left to right, in the order of the table.

ON ANIMAL MATH

PRINTABLE **Line Graphs**: sheets 1-3

MAKER **Graph Paper**: Paper Type Square Grid, Square Size 1/2 Inch

EXIT TICKET **4th Grade Data and Probability Exit Tickets**: Exit Ticket 13.6

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Lesson 13.7: Outcomes and how likely

GOAL Students list the possible outcomes of a spinner, a number cube or a bag of cubes, each once, and say how likely an event is: impossible, unlikely, equally likely, likely or certain.

I can list the outcomes and tell how likely an event is.

About 45 minutes

★ Taught in 4th grade in some states

THE LESSON

1. **Warm up** (5 min) Flip a coin. Ask what could happen (heads or tails) and whether one is more likely than the other.
2. **Teach** (10 min) Show the spinner: 6 red parts, 1 green and 1 blue. The outcomes are red, green and blue, each listed once. Place events on a line from impossible to certain: yellow is impossible, blue unlikely (1 of 8), red likely (6 of 8), and red, green or blue certain. For equally likely, roll a number cube: an even number is on 3 of the 6 faces, half.

   > **Say:** "I compare the parts that fit with all the parts: none is impossible, under half unlikely, half equally likely, over half likely, and all of them certain."

3. **Try it together** (10 min) Partners spin a paper clip spinner 20 times and tally. Do the results fit their words? Then they draw a spinner where blue is likely and yellow is impossible.
4. **Practice** (15 min) Students list outcomes on sheets 1 and 3 of Possible Outcomes, circle possible or impossible on sheet 2 and match events on sheet 4, then name how likely events are on sheet 1 of Probability. Early finishers do the experiment on sheet 5 of Possible Outcomes.
5. **Exit ticket** (5 min) Students do **Exit Ticket 13.7** and circle a face beside the "I can" line. On question 1, look for 2, 3, 6 and 8 in any order, each once; 3, 2, 3, 6, 3, 8 lists every part. On question 2, look for equally likely (3 of 6 parts) and impossible; likely for a 3 takes the most parts for more than half.

Need help? Color the parts that fit, then compare them with all the parts.

Ready for more? Design a spinner with 8 parts where every word, from impossible to certain, fits an event.

GET READY

- A spinner with 8 equal parts: 6 red, 1 green and 1 blue
- A number cube, a coin, paper clips and pencils
- Word cards from impossible to certain

WORDS TO USE

outcome: one thing that can happen

equally likely: as likely to happen as not: half the time

impossible and certain: can never happen; will always happen

ASK

- What could happen? Did you list each outcome once?
- How many parts fit? How many in all?
- Can you make a spinner where red is equally likely?

WATCH FOR

Lists an outcome once for every part. Each different outcome is listed one time, however many parts it has.

Calls the outcome with the most parts likely. Compare it with half: 5 of 10 is half, so it is equally likely.

Thinks a result that just came up is less likely next time. Each spin starts fresh: the parts did not change.

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PRINTABLE **Possible Outcomes**: sheets 1-5

PRINTABLE **Probability**: sheet 1

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Lesson 13.8: Probability as a fraction

GOAL Students write the probability of an event as a fraction, the outcomes that fit over all the equally likely outcomes, from 0 for impossible to 1 for certain, and place it on a number line from 0 to 1.

I can write a probability as a fraction from 0 to 1.

About 45 minutes

★ Taught in 4th grade in some states

THE LESSON

1. **Warm up** (5 min) Review the words: where do impossible, equally likely and certain go on a number line from 0 to 1? (At 0, at 1/2 and at 1.)
2. **Teach** (10 min) Show the bag: 5 red and 7 blue marbles, 12 in all. The probability of red is 5 out of 12, written 5/12. Blue is 7/12, likely, because it is more than 1/2. Green is 0/12, or 0: impossible. Red or blue is 12/12, or 1: certain. Mark each one on the number line.

   > **Say:** "The probability is the outcomes that fit over all the outcomes. Zero means impossible and one means certain."

3. **Try it together** (10 min) Partners write the probability of each event for the spinner numbered 1, 1, 1, 1, 2, 3: a 1 (4/6), a 3 (1/6), a 2 or a 3 (2/6), a 4 (0) and less than 4 (1), then place them on a number line.
4. **Practice** (15 min) Students write probabilities as fractions on sheet 2 of Probability, place them on number lines on sheet 3, and make spinners, bags and stories to fit given probabilities on sheet 5.
5. **Exit ticket** (5 min) Students do **Exit Ticket 13.8** and circle a face beside the "I can" line. On question 1, look for 1/8 for a W and 7/8 for an S, T or V; 1/7 compares the W tile with the others, so ask how many tiles there are in all. On question 2, look for 1/5 circled; 0 is impossible and 3/4 is likely.

Need help? Lay out real cubes and move the ones that fit into a pile first.

Ready for more? Fill a bag of 12 cubes so the probability of green is 1/4 and of red is 0.

GET READY

- A bag of 12 marbles: 5 red and 7 blue
- A number line from 0 to 1
- A spinner with 6 equal parts: 1, 1, 1, 1, 2, 3

WORDS TO USE

probability: how likely an event is, as a number from 0 to 1

favorable outcomes: the outcomes that fit the event

0 and 1: impossible and certain

ASK

- How many outcomes are there in all? How many fit?
- Is the probability more or less than 1/2? Which word fits?
- What is the probability of something that cannot happen?

WATCH FOR

Writes the outcomes that fit over the ones that do not. The bottom number is all the outcomes: count every tile or part.

Thinks a probability can be more than 1. The outcomes that fit are never more than all of them.

Counts a color once when it has several parts. Count every part that fits, not just the kinds.

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PRINTABLE **Probability**: sheets 2-3 and 5

EXIT TICKET **4th Grade Data and Probability Exit Tickets**: Exit Ticket 13.8

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