



**THIRD SPACE
LEARNING**

Math Intervention Pack

Understanding probability of a
chance event

Grade 7

How To Use This Resource

1. Title Slide

Use this slide to activate prior knowledge needed for lesson. Students should be encouraged to initially attempt the question presented independently.

2. Prior Learning

Use this slide to review the knowledge that will be required to be successful in this lesson. If students feel confident on the prior learning section of the Title Slide then this slide can be skipped

3. Let's Learn

Use this slide to introduce the concept. Tutors should work with the student to explore the concept together, usually using diagrams to support understanding.

4. Follow Me + Your Turn

The tutor should work through the follow me slide, modeling the process and explaining their thinking out loud.

Students should use the your turn slide as an opportunity to work through a question similar to the follow me questions. They should apply the method modeled by the tutor in the follow me slide. Students should be encouraged to explain their thinking out loud.

5. You Do

Students should work through a range of questions that build in complexity.

Tutors can offer support but students should initially be encouraged to attempt these questions independently.

6. Go Further

Use this slide to allow students to apply their understanding to a more challenging question in an unfamiliar context.

How To Use This Resource

7. Support for Slides

The support slide is used to support students during the lesson. In the tutor notes, there will be guidance as to when to use the support slide.

8. Check Your Understanding

Tutors should use this slide to assess the student's knowledge and whether or not they have mastered the concept within the lesson.

Standard

7.SP.C.5 - Understand that the probability of a chance event is a number between 0 and 1 that expresses the likelihood of the event occurring. Larger numbers indicate greater likelihood. A probability near 0 indicates an unlikely event, a probability around $\frac{1}{2}$ indicates an event that is neither unlikely nor likely, and a probability near 1 indicates a likely event.

Key Mathematical Ideas

1. Understand that the probability of a chance event is a number between 0 and 1.
2. Understand the probabilities 'impossible, unlikely, even chance, likely, certain' and where they belong on the probability scale.
3. Given a probability, in fraction or percent form, place it on the probability scale.

Overview

Terminology

- **Probability:** The measure of likelihood of an event.
- **Certain event:** Event with a probability of 1 on a scale from 0 to 1; guaranteed to happen.
- **Impossible event:** Event with a probability of 0 on a scale from 0 to 1; will not happen.

Sentence Stems

- The probability is (impossible, unlikely, even chance, likely, certain), because...
- The event belongs here on the probability scale, because...

Overview

Common Misconceptions

Common Misconceptions	Tutoring Strategies	Checks for Understanding
Students who do not understand impossible or certain events.	Utilize the real world examples of impossible and certain events to help students make connections. Additional examples include: <ul style="list-style-type: none">• Certain events: I will have one birthday next year; The sun will set this evening.• Impossible events: The month July will come before June; a baby will be elected president this year.	Ask students to explain why an event is impossible or certain. Also ask them to give their own examples.
Students who cannot place probabilities on the scale.	Use the Prior learning slide to review fractional values.	Ask students to explain how they placed a given probability on the scale.

Title Slide

If students...

- get both sections correct:
 - start at You do
- miss the learning goal section only:
 - start at Let's Learn
- miss the prior learning section:
 - start at Prior Learning

Prior Learning

If stuck

- Indicate where $\frac{1}{2}$ is on each number line and compare the other fractions to it.
- Add the fractional values for 0 and 1 to the number lines as well.

Let's Learn

If stuck

- Review the fractional values covered in the Prior Learning slide.

Questions

- Where are events that are not very likely on the scale? (Close to 0.)
- Where are the events that are very likely on the scale? (Close to 1.)
- a – f) How did you decide where to place the event? (Answers will vary.)
- a – f) What fractional value would you assign the probabilities? Explain. (Answers will vary.)

Watch out for

- Students who do not understand impossible or certain events.
- Students who cannot place probabilities on the scale.

Answers

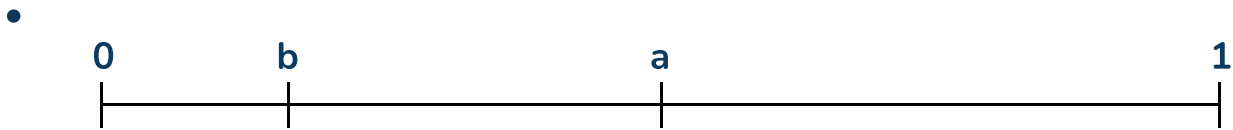
- a) Unlikely
- b) Certain
- c) Even chance
- d) Unlikely
- e) Likely
- f) Answers may vary - ask students to correctly justify

Follow me

Modeling prompts

- Indicate where each probability is on the scale.
- Explain how likely it is to occur, by choosing the corresponding phrase:
 - Impossible
 - Very unlikely
 - Unlikely
 - Even chance
 - Likely
 - Very likely
 - Certain

Answers



Your turn

If stuck

- Use similar guidance given in the Modeling prompts.

Questions

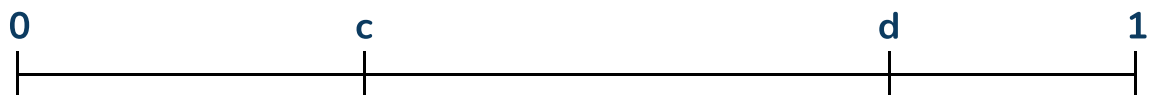
- c) What are 0, $\frac{1}{2}$ and 1 as percents? (0%, 50% and 100%.)
- c) About where is 30% on the scale? (The halfway point between 0 and $\frac{1}{2}$ on the scale is 25%. So 30% will be slightly above that.)
- d) What are 0, $\frac{1}{2}$ and 1 in ninths? ($\frac{0}{9}$, $\frac{4.5}{9}$ and $\frac{9}{9}$.)
NOTE: The fraction $\frac{4.5}{9}$ is only used to help students think about the halfway point.
- d) About where is $\frac{7}{9}$ on the scale? (Since $\frac{7}{9}$ is 2 away from $\frac{9}{9}$ and 2.5 from the middle, it slightly closer to 1 than $\frac{1}{2}$.)

Watch out for

- Students who cannot place probabilities on the scale.

Answers

•



You do

If stuck

- Review the fractional values covered in the Prior Learning slide.
- Use the Support for question 3.

Questions

- 1) Where are events that are not very likely on the scale? (Close to 0.)
- 1) Where are the events that are very likely on the scale? (Close to 1.)
- 1a) How did you decide where to place the event? (The next week will have 7 days, so only having 6 days is impossible.)
- 1b) How did you decide where to place the event? (The numbers on the dice are 1, 2, 3, 4, 5, 6 and half of those are even, so the probability is 50%.)

NOTE: Students are not expected to calculate probability in this lesson. This example is given, because most students will “just know” from experience. Give them the probability if necessary.

- 1b) What fractional value would you assign the probabilities? Explain. (50% is equal to $\frac{1}{2}$. This makes sense because rolling an even number would be 2, 4, 6 and rolling an odd would be 1, 3, 5, so they both have an even chance.)
- 1c & 1d) How did you decide where to place the event? (Answers will vary.)
- 1c & 1d) What fractional value would you assign the probabilities? Explain. (Answers will vary.)

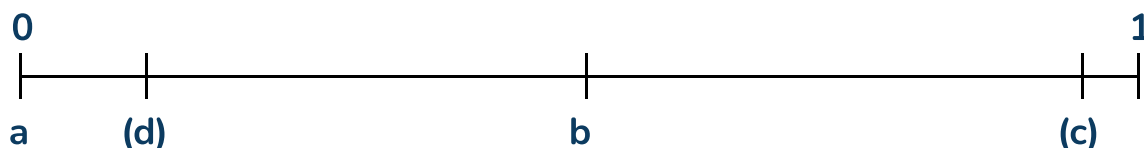
- 2a) What are 0, $\frac{1}{2}$ and 1 in eighths? ($\frac{0}{8}$, $\frac{4}{8}$ and $\frac{8}{8}$.)
- 2a) About where is $\frac{7}{8}$ on the scale? (Since $\frac{7}{8}$ is $\frac{1}{8}$ away from $\frac{8}{8}$ and $\frac{3}{8}$ from the middle, so it is almost at 1.)
- 2b) What are 0, $\frac{1}{2}$ and 1 as percents? (0%, 50% and 100%.)
- 2b) About where is 62.5% on the scale? (The halfway point between $\frac{1}{2}$ and 1 on the scale is 75%. So 62.5% is right in the middle of 50% and 75%.)

Watch out for

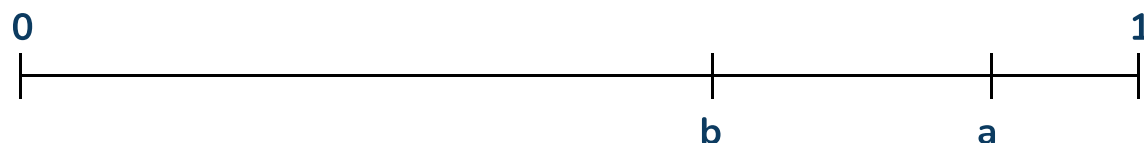
- Students who do not understand impossible or certain events.
- Students who cannot place probabilities on the scale.

Answers

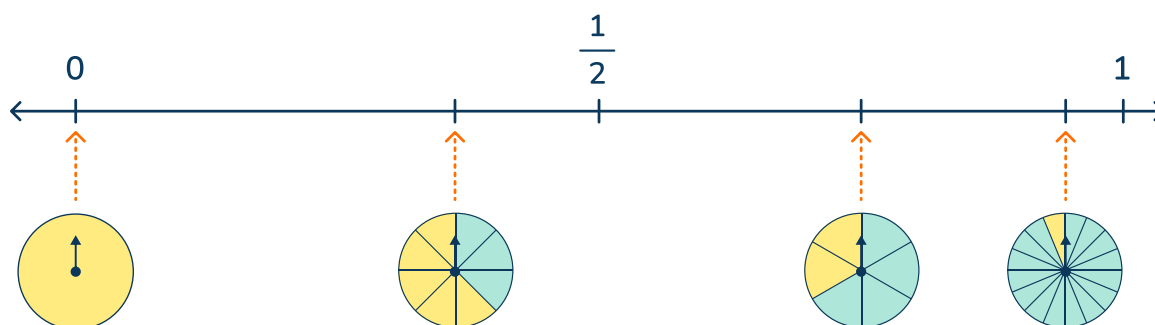
- 1.



- 2.



- 3.



Go further

If stuck

- Help students assign fractional values to each part of the spinner.

Questions

- Why are the probabilities the same, even though the spinners look different?
(Both spinners have the same percentage of each color. It doesn't matter that they are in different places on the spinner or that they are broken up in different ways. Since the amount for each color is the same, the probability is the same.)

Watch out for

- Students who think the probabilities are different between spinners since they are not designed in the same way.

Answers

- The probability of a pink is EQUAL CHANCE because half of each spinner is pink.
- The probability of green is UNLIKELY because one quarter of each spinner is green.
- The probability of red is UNLIKELY because one quarter of each spinner is red.
- Other comparisons:
 - The probability of red or green is EVEN CHANCE as half of each spinner is red or green
 - The probability of not spinning red/green is LIKELY as three quarters of each spinner is not red/green
 - The probability of yellow is IMPOSSIBLE as there are no yellow sections on either spinner..

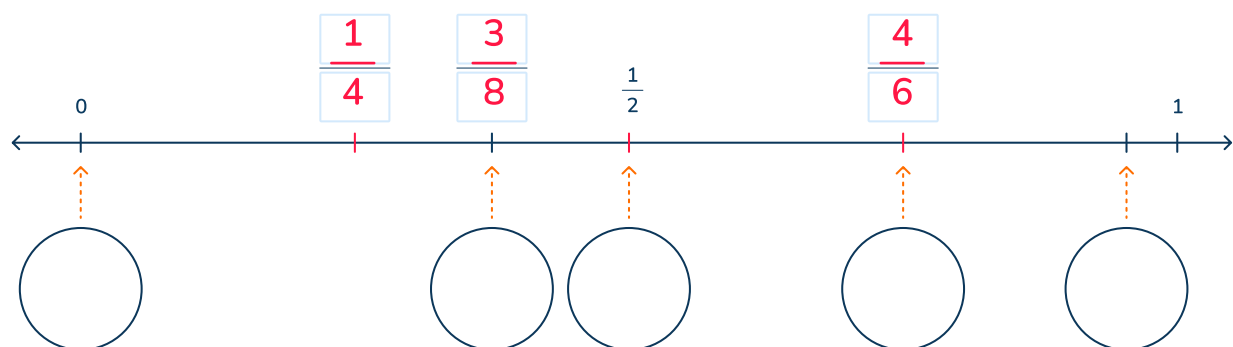
Support for Slide(s)

Questions

- a) How many fourths is equivalent to $\frac{1}{2}$? ($\frac{2}{4}$.)
- a) What is in the middle of $\frac{2}{4}$ and 0? ($\frac{1}{4}$.)
- a) What is in the middle of $\frac{2}{4}$ and 1? ($\frac{3}{4}$.)
- b) How many eighths is equivalent to $\frac{1}{4}$? ($\frac{2}{8}$.)
- b) What is in the middle of $\frac{2}{8}$ and 0? ($\frac{1}{8}$.)
- b) What is in the middle of $\frac{2}{8}$ and $\frac{4}{8}$? ($\frac{3}{8}$.)
- c) If the probability of green is 0, how much green is on the spinner? (None.)
- c) How can we show $\frac{3}{8}$ on the spinner? (Answers will vary.)
- c) How can we show $\frac{3}{4}$ on the spinner? (Answers will vary.)
- c) How can we show a fraction greater than $\frac{7}{8}$ and close to 1 on the spinner?
(Answers will vary.)

Answers

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Check your Understanding

Correct answer:

- a) unlikely
- b) likely

Today you will learn about

Understanding probability of chance events



Learning Goal

The probability of randomly picking a prime number between 1 and 10 is 40%. Represent this probability on the scale to describe how likely the event is to occur.



Prior Learning

Estimate the value of each point on the number line.



a

.....

b

.....

Prior learning

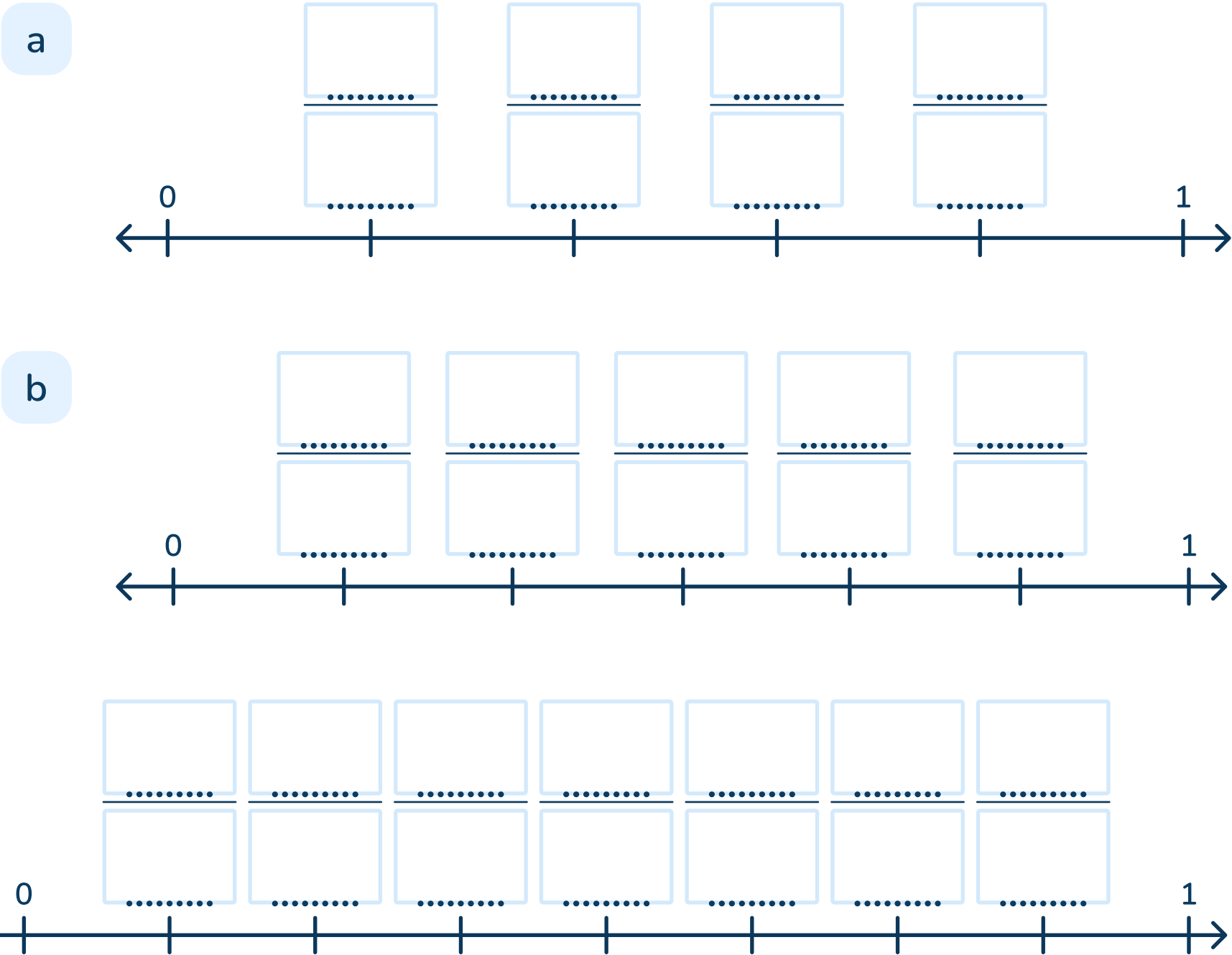
Before we can understand probability, we need to be able to **estimate fractional values between 0 and 1**.

To estimate, we need to know where halves, thirds, fourths, etc. fall on the number line.

When we are not sure, we can divide the number line into equal parts. Let's look at a few examples!



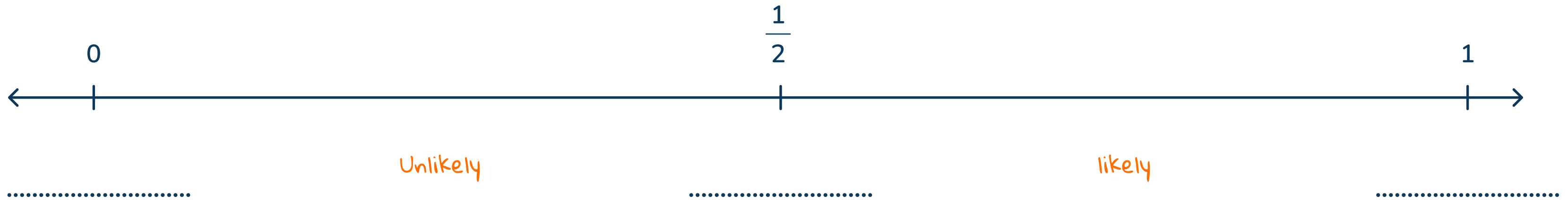
Compare the points x and y to the fractional number lines



Let's learn

Probability measures the likelihood that an event will occur.

To define a probability mathematically, we use a scale from 0 to 1, where 0 is impossible and 1 is certain.



Decide where each event would fall on the probability scale.

An **event** is the outcome or result.

a Tomorrow will be Sunday.

c If you flip a fair coin,
it will land on tails.

e It will rain next week.

b The sun will rise tomorrow.

d If you go out to eat dinner,
you will see your teacher at
the restaurant.

f You will read a book
tomorrow.



Follow me



Your turn



We can use the scale to place probabilities shown as fractions, decimals or percents.



Place each probability on the scale to describe how likely the event is to occur.

a The probability of flipping heads on a fair coin is 50%

.....

b The probability of rolling a 6 on a fair die is $\frac{1}{6}$

.....

Place each probability on the scale to describe how likely the event is to occur.

c The probability of randomly picking a prime number between 1 and 10 is 30%

.....

d The probability of drawing a red bead from a bag is $\frac{7}{9}$

.....

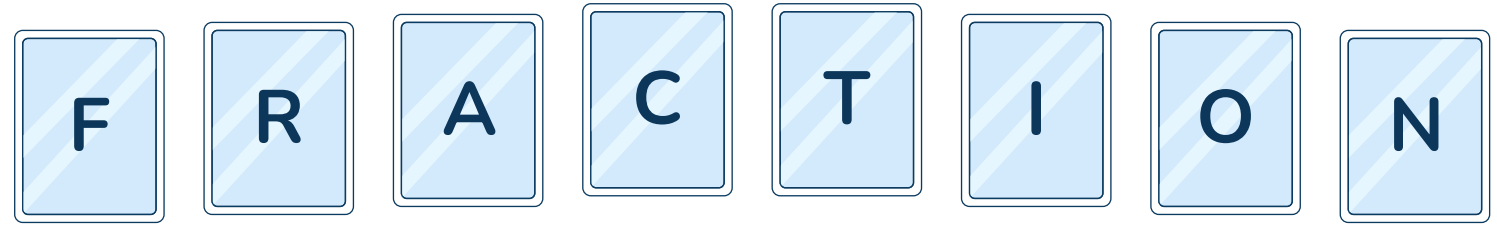
You do

- 1 Decide where each event would fall on the probability scale.

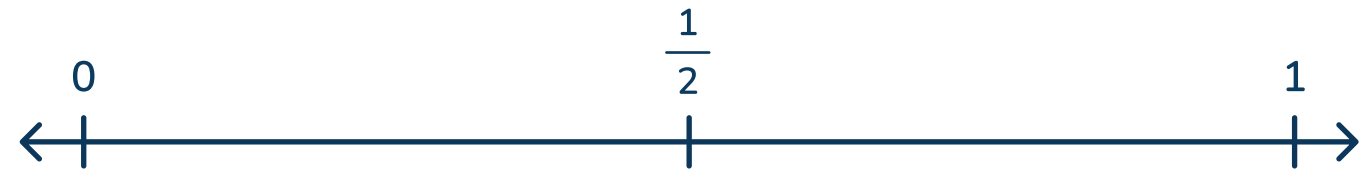


- a Next week will have 6 days.
- b If you roll a fair die, it will land on an even number.
- c Tonight you will watch TV.
- d Tomorrow you will go to the beach.

- 2 The following cards are placed into a bag and picked out randomly.

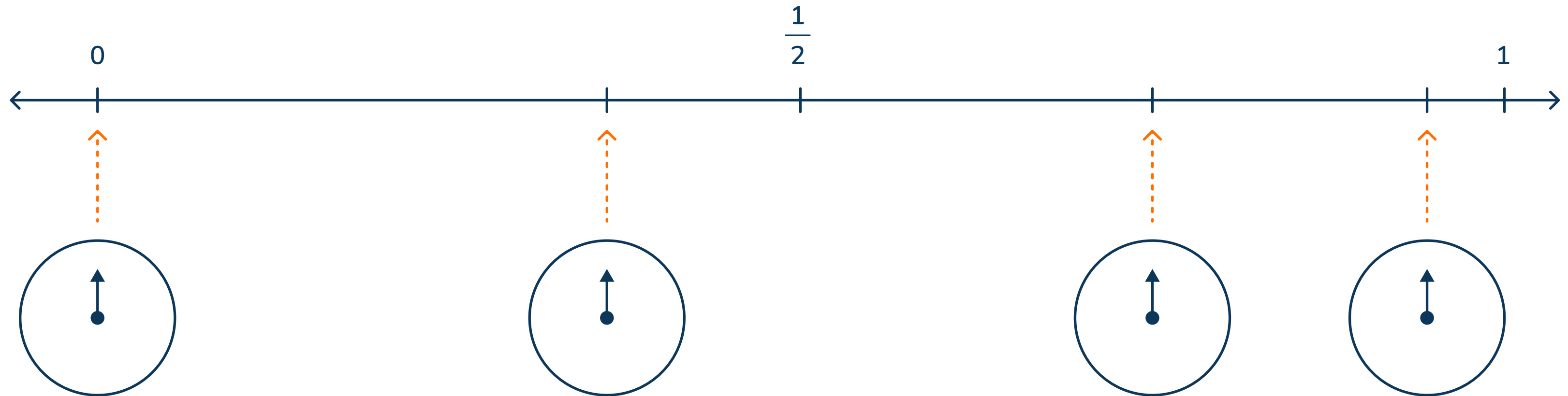


Place each probability on the scale to describe how likely the event is to occur.



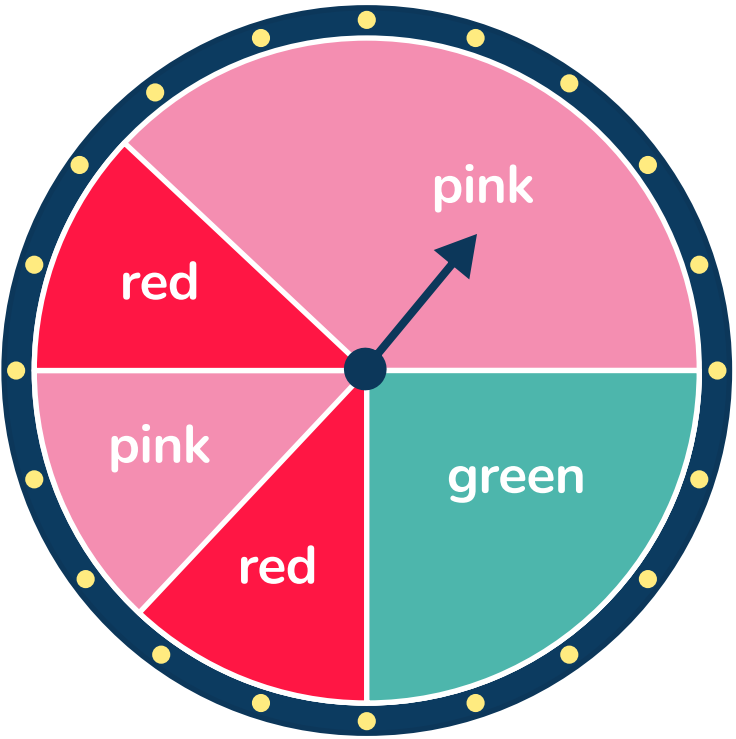
- a The probability of NOT picking the F is $\frac{7}{8}$
.....
- b The probability of picking a consonant is 62.5%
.....

- 3 There are four blank spinners below. The orange arrow shows how likely each spinner is to land on green.
Fill in each spinner so that it matches the probability scale.

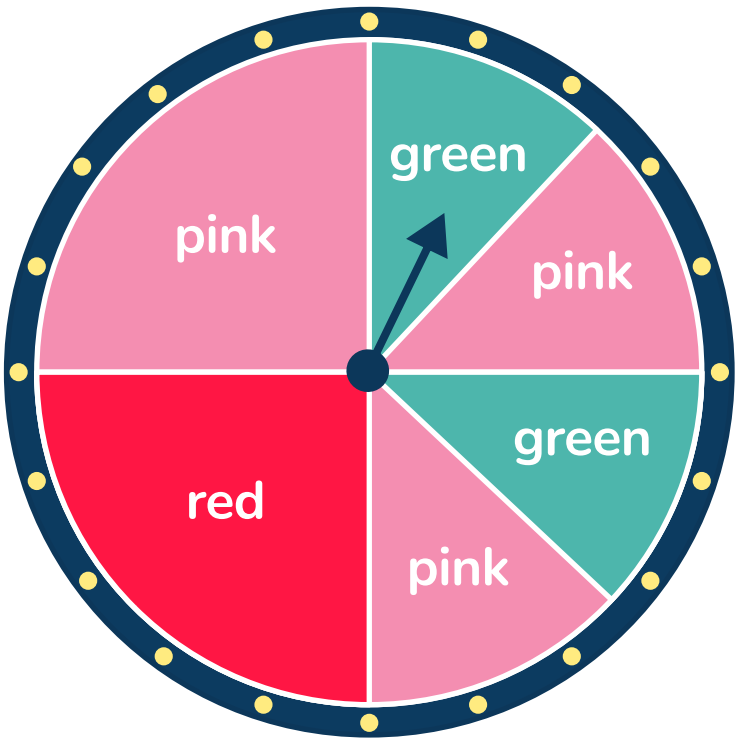


Let's compare the probability of two different events.

Kylie's spinner



Nolan's spinner



Compare the probabilities of spinning pink, red or green on Kylie and Nolan's spinners.

.....

.....

.....

.....

.....

Let's look at this one more closely!

Use benchmark fractions to help estimate the values on the number line. **Benchmark fractions** should be common fractions that are easy to represent.

- a

Label the fourths on the number line.

The spinner's probability fraction is directly related to the fraction shown by the circle.
- b

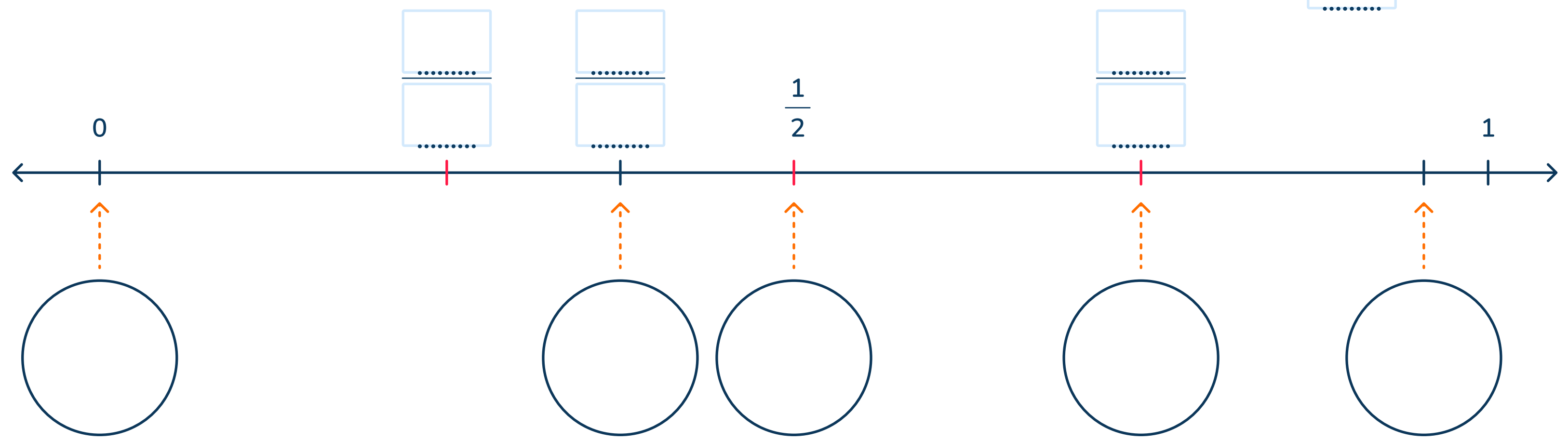
Label the eighths on the number line.

c

For example, to show a probability of $\frac{1}{2}$, shade in

.....
.....

 of the circle.

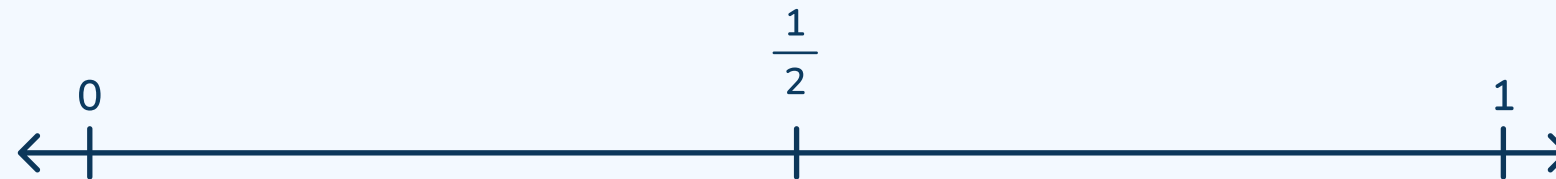


Check your understanding

The following cards are placed into a bag and picked out randomly.



Place each probability on the scale to describe how likely the event is to occur.



a The probability of picking a B is $\frac{2}{11}$

.....

b The probability of picking a consonant is 63.6%

.....

Why do I need to try this question on my own first?

- To show your tutor what you understand
- To give you more practice
- To show your teacher how you are doing



Do you have a group of students who need a boost in math?

Each student could receive personalized lessons every week from our specialist one-on-one math tutors.




- ✓ Differentiated instruction for each student
- ✓ Aligned to your state's standards
- ✓ Scaffolded learning to close gaps

“We just had our first session and it went great! The kids really liked it and felt like they were learning! One even said he finally felt like math was making sense.”



Michelle Craig, Instructional Coach,
Sherwood Forest Elementary, Washington

Speak to us

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