

Teacher Guide for the Lesson on **probability**

Standard:
7.6(D)

Content Objective:

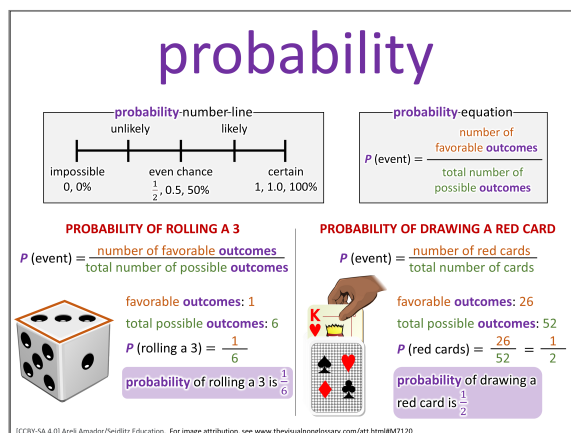
We can determine **probability** and use it to describe what is likely to happen by comparing favorable **outcomes** to total possible **outcomes**.

Language Objective: Answer the following question in complete sentences using the sentence stem and the key vocabulary of the lesson:

How does increasing the number of trials in an experiment affect the **probability** of an **outcome**?

*Increasing the number of trials in an experiment affects the **probability** of an **outcome** by...*

Other key vocabularies: [probability experiment](#), [outcome](#)



probability

probability-number-line
unlikely likely
impossible 0, 0% even chance $\frac{1}{2}$, 0.5, 50% certain 1, 1.0, 100%

probability equation
 $P(\text{event}) = \frac{\text{number of favorable outcomes}}{\text{total number of possible outcomes}}$

PROBABILITY OF ROLLING A 3
 $P(\text{event}) = \frac{\text{number of favorable outcomes}}{\text{total number of possible outcomes}}$
favorable outcomes: 1
total possible outcomes: 6
 $P(\text{rolling a 3}) = \frac{1}{6}$
probability of rolling a 3 is $\frac{1}{6}$

PROBABILITY OF DRAWING A RED CARD
 $P(\text{event}) = \frac{\text{number of red cards}}{\text{total number of cards}}$
favorable outcomes: 26
total possible outcomes: 52
 $P(\text{red cards}) = \frac{26}{52} = \frac{1}{2}$
probability of drawing a red card is $\frac{1}{2}$

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By studying this visual, students might:

| Notice | Wonder |
|--|---|
| <ul style="list-style-type: none"> The word probability is shown with numbers between 0 and 1 | <ul style="list-style-type: none"> Why some outcomes are more likely than others |
| <ul style="list-style-type: none"> A formula compares favorable outcomes to total outcomes | <ul style="list-style-type: none"> How to find the total number of outcomes |
| <ul style="list-style-type: none"> Examples include rolling a die and drawing a card | <ul style="list-style-type: none"> What happens when an event happens many times |
| <ul style="list-style-type: none"> Some outcomes are more likely than others | <ul style="list-style-type: none"> If probability can ever be greater than 1 |

| | |
|---|--------------------------------------|
| • A number line shows impossible to certain | • How probability works in real life |
|---|--------------------------------------|

EXTENDING THE DISCUSSION

- After randomly calling on students, if there is anything from this list that was not mentioned, then ask the class, "Did anyone notice...?"
- After students have shared what they notice, ask the class, "Did anyone wonder...?" using the suggestions above or anything else you might think is interesting or relevant to the lesson.

Structured Conversation Prompts

| OBSERVATIONAL | RELATIONAL | INFERENTIAL |
|--|---|---|
| <p>What is probability?</p> <p>Probability is...</p> | <p>How is probability different from a probability experiment?</p> <p>Probability is different from a probability experiment because...</p> | <p>How does increasing the number of trials in an experiment affect the probability of an outcome ?</p> <p>Increasing the number of trials in an experiment affects the probability of an outcome by...</p> |

Example Student Responses to the Observational Question

| Low-Level | High-Level |
|---|--|
| <p>Probability is how likely an outcome is to happen.</p> | <p>Probability is the chance that a specific outcome will happen based on the number of favorable outcomes compared to the total number of outcomes.</p> |

RESPONDING TO RESPONSES

Emphasize and celebrate each student's use of the key vocabulary to support a culture of "no wrong answers."

STRUCTURING STUDENT CONVERSATIONS

Have students list observations from the visual as a warm-up, then use the Q-SSS-A process to guide small-group conversations. In the slide decks, brackets can be moved to prepare the structured conversation. In the example to the right, students will be instructed: [Q-SSS-A](#).



- To put a thumb up, then lower their hand when they are ready to answer the question
- To share with their elbow/shoulder partner, and that the student with the darkest shoe will share first
- That they will be randomly called on after the conversation

[Here is an example](#) of structuring a conversation with Q-SSS-A.

Note: the inferential question is the same as the language objective. It is recommended that students answer the inferential question in a small-group discussion before answering it individually as the closure or exit ticket of the lesson.

Structured Reading

| READING PURPOSE | PAT LIST | POST-READING DISCUSSION |
|--|--|--|
| The purpose for reading is to understand how probability applies to real world situations by analyzing possible outcomes . | <ul style="list-style-type: none"> • how many outcomes are possible in each example • how many outcomes are favorable • how probability is described using numbers • how real world situations show different outcomes | <p>How does probability apply to the basketball player making 7 out of 10 shots?</p> <p>Probability applies to the basketball player making 7 out of 10 shots because...</p> |

STRUCTURING THE READING

Communicate the purpose of reading to the students and instruct them to make a note every time they see something on the PAT ("Pay Attention To") list. How you have students note items on the PAT list is up to you. This could include:




- Putting an asterisk in the margin
- Underlining text that supports the PAT list
- Putting a comment in the margin

Follow the reading with the post-reading discussion. Structure this discussion using the Q-SSS-A process just like the structured conversations in this lesson.

Note: you might find the relational question is better discussed before or after the reading. This depends on whether the relational question is directly related to the reading or might make connections across units.

DIFFERENTIATING THE READING

You will notice that three different reading passages are provided with this lesson. Look at the shapes in the top-left of each passage to determine the grade level.

| BELOW GRADE LEVEL | ON GRADE LEVEL | ABOVE GRADE LEVEL |
|--|--|--|
|  <i>Triangle is bottom-left</i> |  <i>Square is bottom-left</i> |  <i>Circle is bottom-left</i> |

In a class with students at diverse reading level proficiencies, you can give the appropriate reading passage to different students, while having all students follow the same PAT list and post-reading discussion.