LESSON MAKER PRO

Outcome Sequence Lab

Build sample spaces for repeated trials.

GRADE 8 · MA.8.DP.2.1

MA.8.DP.2.1 "Determine the sample space for a repeated experiment."

NAME _____ DATE _____

TRACK THE ORDER

A sample space is the complete set of possible outcomes. In a repeated experiment, order matters because a result on the first trial followed by a result on a later trial is a different outcome from the reverse order. When each trial has the same choices, multiply the number of choices for each trial to find the total number of ordered outcomes.

WORKED EXAMPLE

A music app can play one of 3 alert sounds: Bell, Chime, or Drum. It chooses a sound 3 times. How many ordered outcomes are in the sample space?

1. Each choice has 3 possible sounds.
2. Multiply the choices for all 3 selections.
3. 3 x 3 x 3 = 27.

Answer: There are 27 ordered outcomes. One possible outcome is (Bell, Chime, Drum).

PRACTICE 6 problems

1 A coin is tossed twice. List the sample space.

ANSWER _____

2 A device makes a two-character signal by choosing from A, B, C, and D for each character. List the sample space.

ANSWER _____

3 A spinner has four equal sections labeled P, Q, R, and S. It is spun twice. How many ordered outcomes are in the sample space?

ANSWER _____

4 A bag has cards labeled J, K, L, M, and N. You choose a card, replace it, and choose again. How many ordered outcomes are in the sample space?

ANSWER _____

5 A coin is tossed four times. How many ordered outcomes are in the sample space?

ANSWER _____

6 A spinner has four equal sections labeled R, S, T, and V. It is spun four times. How many ordered outcomes are in the sample space?

ANSWER _____

APPLY IT Show your work

1 A gaming platform assigns one of four profile frames, Neon, Pixel, Cosmic, or Forest, after each of two tournament rounds. Determine the sample space and the number of possible ordered frame pairs.

WORK SPACE

ANSWER _____

2 A music app recommends a genre for the first song and a genre for the second song. Each recommendation can be Hip-hop, Rock, Pop, Jazz, or Electronic. Determine the sample space and the number of possible ordered genre pairs.

WORK SPACE

ANSWER _____

CHALLENGE One step up

A digital locker code has four positions. At each position, the app randomly chooses one symbol from A, B, C, D, or E. Symbols may repeat. How many codes are in the sample space? Explain your reasoning.

WORK SPACE AND ANSWER

ANSWER KEY

Outcome Sequence Lab

GRADE 8 · MA.8.DP.2.1

PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	A coin is tossed twice. List the sample space.	**{HH, HT, TH, TT}**
2	A device makes a two-character signal by choosing from A, B, C, and D for each character. List the sample space.	**{AA, AB, AC, AD, BA, BB, BC, BD, CA, CB, CC, CD, DA, DB, DC, DD}**
3	A spinner has four equal sections labeled P, Q, R, and S. It is spun twice. How many ordered outcomes are in the sample space?	**16**
4	A bag has cards labeled J, K, L, M, and N. You choose a card, replace it, and choose again. How many ordered outcomes are in the sample space?	**25**
5	A coin is tossed four times. How many ordered outcomes are in the sample space?	**16**
6	A spinner has four equal sections labeled R, S, T, and V. It is spun four times. How many ordered outcomes are in the sample space?	**256**

PART 2 · APPLY IT

1. **{(Neon, Neon), (Neon, Pixel), (Neon, Cosmic), (Neon, Forest), (Pixel, Neon), (Pixel, Pixel), (Pixel, Cosmic), (Pixel, Forest), (Cosmic, Neon), (Cosmic, Pixel), (Cosmic, Cosmic), (Cosmic, Forest), (Forest, Neon), (Forest, Pixel), (Forest, Cosmic), (Forest, Forest)}; 16 ordered frame pairs** Pair each possible frame from the first round with each possible frame from the second round. There are 4 x 4 = 16 ordered pairs.
2. **{(Hip-hop, Hip-hop), (Hip-hop, Rock), (Hip-hop, Pop), (Hip-hop, Jazz), (Hip-hop, Electronic), (Rock, Hip-hop), (Rock, Rock), (Rock, Pop), (Rock, Jazz), (Rock, Electronic), (Pop, Hip-hop), (Pop, Rock), (Pop, Pop), (Pop, Jazz), (Pop, Electronic), (Jazz, Hip-hop), (Jazz, Rock), (Jazz, Pop), (Jazz, Jazz), (Jazz, Electronic), (Electronic, Hip-hop), (Electronic, Rock), (Electronic, Pop), (Electronic, Jazz), (Electronic, Electronic)}; 25 ordered genre pairs** Match every first-song genre with every second-song genre. There are 5 x 5 = 25 ordered pairs.

CHALLENGE

625 codes. Each of the four positions has five choices, so 5 x 5 x 5 x 5 = 625.

Accept any complete sample space listed in a different order. Ordered outcomes must distinguish the first trial from later trials, so reversed results count as different outcomes when the entries differ.