LESSON MAKER PRO

# Chance Chain

*Multiply probabilities for two events.*

**GRADE 8 · 8.PS.1**

**8.PS.1** "The student will use statistical investigation to determine the probability of independent and dependent events, including those in context..."

NAME _____ DATE _____

## TWO-EVENT PROBABILITY

Independent events do not change each other, so multiply their probabilities. Dependent events change after the first event, so use the new total. Replacing an item keeps the probabilities the same.

## WORKED EXAMPLE

A bag has 3 red and 4 blue tiles. Draw a red tile, replace it, then draw a red tile again. Find the probability.

1. There are 7 tiles total.
2. P(red first) = 3/7.
3. Replacement makes P(red second) = 3/7.
4. Multiply: 3/7 x 3/7 = 9/49.

**Answer: 9/49**

## PRACTICE 5 problems

**1** Flip a fair coin and roll a standard number cube. Find P(heads and a 6).

**ANSWER** _____

**2** A bag has 8 blue and 6 yellow tiles. Draw a blue tile, do not replace it, then draw a yellow tile. Find the probability.

**ANSWER** _____

**3** A bag has 8 black and 6 white tiles. Draw a tile, replace it, then draw another tile. Are the draws independent or dependent?

**ANSWER** _____

**4** A playlist has 8 pop and 6 rock songs. One song plays and is removed before another plays. Are the selections independent or dependent?

**ANSWER** _____

**5** A jar has 12 white and 8 black beads. Draw 2 white beads without replacement. Find the probability.

**ANSWER** _____

## APPLY IT Show your work

**1** For a school video project, 20 volunteers signed up. Of these, 12 have camera experience. Two volunteers are chosen without replacement. What is the probability that both have camera experience?

WORK SPACE

**ANSWER** _____

**2** You customize a club profile by randomly choosing 1 of 8 background themes and 1 of 6 icon packs. Your favorite theme and favorite icon are each one choice. What is the probability of getting both favorites?

WORK SPACE

**ANSWER** _____

## CHALLENGE One step up

A bag has 12 blue and 8 green tiles. Find P(two blue) with replacement and without replacement. Which probability is greater? Explain.

WORK SPACE AND ANSWER

**ANSWER KEY**

# Chance Chain

**GRADE 8 · 8.PS.1**

## PART 1 · PRACTICE

| # | PROBLEM | ANSWER |
|---|---|---|
| 1 | Flip a fair coin and roll a standard number cube. Find P(heads and a 6). | **1/12** |
| 2 | A bag has 8 blue and 6 yellow tiles. Draw a blue tile, do not replace it, then draw a yellow tile. Find the probability. | **24/91** |
| 3 | A bag has 8 black and 6 white tiles. Draw a tile, replace it, then draw another tile. Are the draws independent or dependent? | **Independent, because replacement keeps the probabilities the same.** |
| 4 | A playlist has 8 pop and 6 rock songs. One song plays and is removed before another plays. Are the selections independent or dependent? | **Dependent, because removing a song changes the total.** |
| 5 | A jar has 12 white and 8 black beads. Draw 2 white beads without replacement. Find the probability. | **33/95** |

## PART 2 · APPLY IT

1. **33/95** Multiply 12/20 by 11/19 because one experienced volunteer is removed after the first choice.
2. **1/48** The choices are independent, so multiply 1/8 by 1/6.

## CHALLENGE

**With replacement: 9/25. Without replacement: 33/95. With replacement is greater because the first blue tile is returned, so the chance of blue stays 12/20.**

Accept equivalent fractions, but simplified answers are shown. For independence explanations, accept statements that replacement keeps probabilities the same and no replacement changes them.