 Pacing 1 Day

4.2 Making Purple: Area Models and Probability

Focus Question How can you use experimental or theoretical probabilities of a compound event to predict the number of times one particular combination will occur out of any given number of repetitions of the event?

Launch

Demonstrate how to analyze a two-stage outcome using an area model. Alternatively, you could first play the Making Purple game to determine experimental probabilities and then, with the whole class, demonstrate how to determine theoretical probabilities using an area model.

Describe the Making Purple game to the class. Demonstrate one or two turns on the two spinners.

Suggested Questions

- *Do you think purple and not purple are equally likely outcomes? Explain.*

Let students work in pairs.

Key Vocabulary

There are no new glossary terms introduced in this Problem.

Materials

Labsheets
- 4.2: Making Purple
- Grid Area Models

Accessibility Labsheet
- 4ACE: Exercise 33

- bobby pins or paper clips

Technology
- Probability Tool

Explore

Circulate as pairs work, assisting those who are having trouble analyzing this two-stage game. Some students may need help in labeling and interpreting the area model. Rather than show them again, ask them some questions.

- *For spinner A, what are the probabilities of getting each color?*
- *How can you represent this on the square?*

For those who finish early ask:

- *What if you have a choice of spinning each spinner once or of spinning one spinner twice? Is the probability of getting purple still the same? Explain.*

Summarize

You could display two sets of spinners like those in the teacher's guide for Problem 4.2 (Summarize) and ask students to decide which set is more likely to make purple. In this instance, the two sets have the same probability of making purple, namely, $\frac{1}{4}$.

ACE

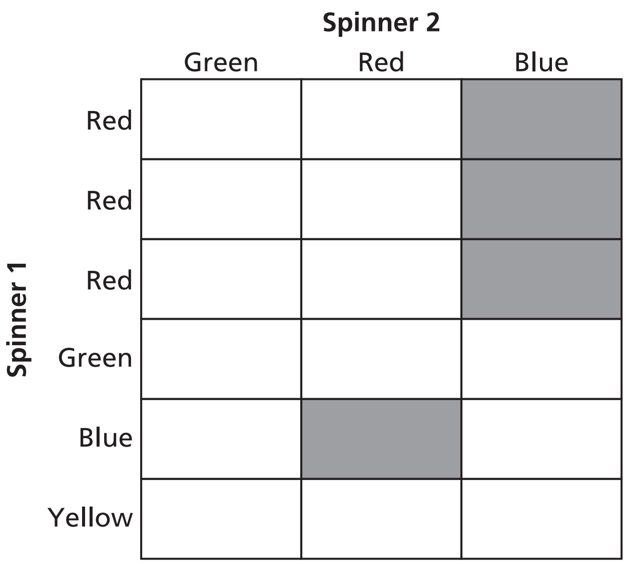
Assignment Guide for Problem 4.2

Applications: 7–14 | Connections: 29–33
Extensions: 50

Answers to Problem 4.2

A. Answers will vary. Some may be close to $\frac{4}{18}$ or $\frac{2}{9}$.

B. The diagram below is a correct area model. The shaded portions represent the ways to get purple with two spinners.
$P(\text{purple}) = \frac{4}{18} = \frac{2}{9}$



C. They are not necessarily the same. However, they may be close to each other due to the number of times the game was played.

D.
1. The school will take in \$72 from this game.
2. 8 people are expected to win; $\frac{2}{9} \times 36 = 8$.
3. The school would expect to pay \$48 for prizes.
4. The school would expect to make \$24 from this game.
5. Possible response: The school should include the game because the game makes a profit even after paying out the prizes. Some students might suggest modifying the game to decrease the chance of people winning prizes so that the school makes a greater profit.