

Outfit Options

STRAND: Probability

STRAND CONCEPT: Outcomes and Probability

SOL 5.15

Remediation Plan Summary

Students create a sample space for a probability experiment, using a set of numbered cards. The sample space is represented as a list and as a tree diagram.

Common Misconceptions

On tree diagrams, some students mistakenly count every individual item in the diagram to answer the question of how many possibilities are shown instead of counting only the final outcomes.

Materials

Sets of red cards labeled 3, 4, 5, 6, 7

Sets of blue cards labeled A, B, C

Calculators

Copies of the attached worksheets

Introductory Activity

Hand out copies of the “Getting Ready for Picture Day” worksheet. Allow students about five minutes to complete it. Then, hold a class discussion about the students’ responses, allowing them to share their clothing choices with the class. Make a list on chart paper or the board of the clothes that were chosen. Use a list form in which tally marks can be used to record the number of times an article of clothing is selected by the class. Lead students into a discussion of the number of different choices that could have been made when they selected clothes. The set of all possible choices can be called a *sample space*. Tell the class that in this lesson, they will focus on ways that a sample space can be represented visually, and they will learn how to represent the probability of an event occurring, using a sample space.

Plan for Instruction

1. Give each pair of students a set of five red number cards and a set of three blue letter cards. Point out that each card can be identified by its color, and number or letter. Have the partners display their cards on a desk or table by color and in alphabetical order. Explain that the experiment will show all outcomes of pairing each of the red cards with each of the blue cards. Stress the importance of having the cards organized.
2. Distribute copies of the “Card-Choice Experiment” worksheet. Read the directions aloud and work through the sample with the class. Ask the students, “Why is it important that we put our cards down in order? How does that help us with this step?” As partners complete the worksheet, move from one pair to another to monitor their work. Take time to clarify or

to allow for sharing. Before students move to the second page of the activity, be sure that they have an understanding of the way the sample space was created and the way the probability of the two example events was determined.

3. Explain that a list is a good way to organize items in a sample space but that sometimes a list may not be convenient or items may be left out of it accidentally. Tell students that another way to organize items in a sample space is to make a visual aid called a “tree diagram.” The word tree is used to describe this type of display because the display resembles a tree with its trunk and branches that extend in an outward direction. The probability of an event occurring can also be determined through the use of a tree diagram.
4. As a class, do the coin flipping experiment so that students can affirm the H-H, T-T, H-T and T-H. Tell them that it is used to organize the items in a sample space that shows the outcomes of flipping a coin twice. Create the list as the class tells you how the coins can land. Next, with the class show how a tree diagram can be made. Next to the diagram is the list of the results for comparison. Ask students what would happen to the diagram if the coin were flipped a third time. Ensure understanding of tree-diagram construction through discussion.
5. Assign the completion of the “Card-Choice Experiment” worksheet. Move from one pair to another to check for understanding.
6. Focus on the mathematical probability that the students compute. Display the answers and as a group compare them to the sample spaces to show how they show the same information.

Pulling It All Together (Reflection)

Ask students to return to their “Getting Ready for Picture Day” worksheet and to create a tree diagram of all of the possible ways that the clothes could have been chosen (see below). Have them draw the tree diagram next to the stick figure or on the back of the page, allowing them to work either with their partner or individually. Collect diagrams at the end of class and evaluate them for understanding.

Note: The following pages are intended for classroom use for students as a visual aid to learning.

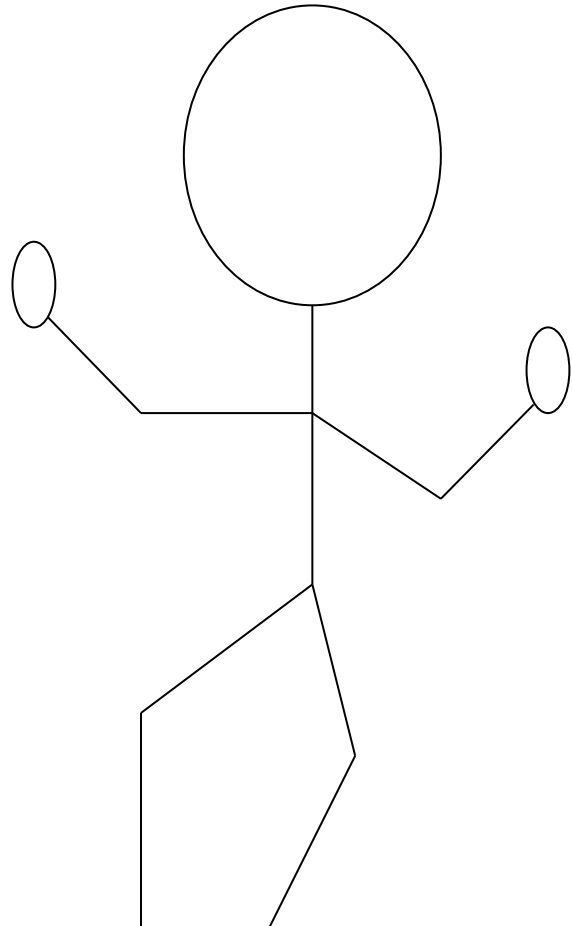
Name: _____

Getting Ready for Picture Day

Read the story below and make decisions based on the choices that are given to you. Write your choices in the blanks provided. Be ready to explain why you made the choices that you did.

Today is the big day. It is picture day at school. You want to look your best, of course. You go to your closet and choose some clothes that might make you look just like you want to look. After a few minutes of taking clothes out of the closet and laying them on your bed, you are ready to make the decision. On the bed you have laid out a pair of faded jeans, a pair of khaki shorts, a white polo shirt, a blue tee shirt, a red turtle neck shirt, a gray sweater, and a dark blue jacket. You look at the jeans and the shorts and decide to wear the _____. Then you look at the polo shirt, the tee shirt, and the turtle neck shirt and decide to wear the _____. Finally, you look at the gray sweater and the blue jacket. You choose the _____.

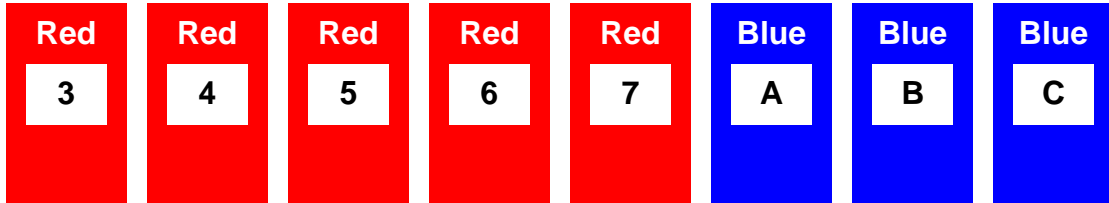
On the stick figure below, draw the clothes that you chose. Be sure to add the colors of choice to each article of clothing. Put shoes on the figure and add a face and hair. Prepare to share your final choices with the class.



Name: _____

Card-Choice Experiment, page 1

1. Place the set of 5 red cards and the set of 3 blue cards on your desk in the following order:



2. Make a list of all possible outcomes of pairing each red card with each blue card. The first set of outcomes is shown.

<u>Red 3, Blue A</u>	<u>Red3, Blue B</u>	<u>Red3, Blue C</u>
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

3. Use the list above to find the probability of drawing a red 3 and a blue B. Show the results as a ratio (fraction).

$$P(\text{Red3, Blue B}) = \frac{\text{number of favorable events}}{\text{number of possible events}} = \underline{\hspace{10em}}$$

4. Use the list above to find the probability of drawing a red 6 and a blue C. Show the results as a ratio (fraction).

$$P(\text{Red 6, Blue C}) = \frac{\text{number of favorable events}}{\text{number of possible events}} = \underline{\hspace{10em}}$$

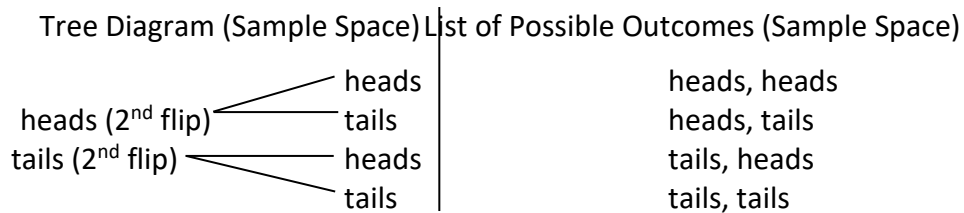
Name: _____

Card-Choice Experiment, page 2

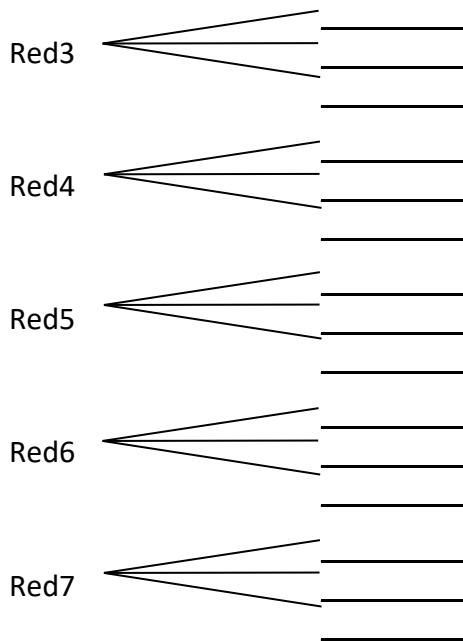
Flipping the coin always results in either heads or tails. What are the possible outcomes of flipping a coin twice?

- If heads is the result of the first flip, then the possible outcomes of two flips are heads, heads or heads, tails.
- If tails is the result of the first flip, then the possible outcomes of two flips are tails, heads or tails, tails.

These results can be displayed as a tree diagram or as a list.



1. Create a tree diagram showing all possible outcomes of the Card-Choice Experiment.



2. Use your tree diagram to determine the following outcomes. Show the probability of each as a ratio (fraction).

The probability of getting red5 and blue A =

$$\frac{\text{number of favorable events}}{\text{number of possible events}} =$$
