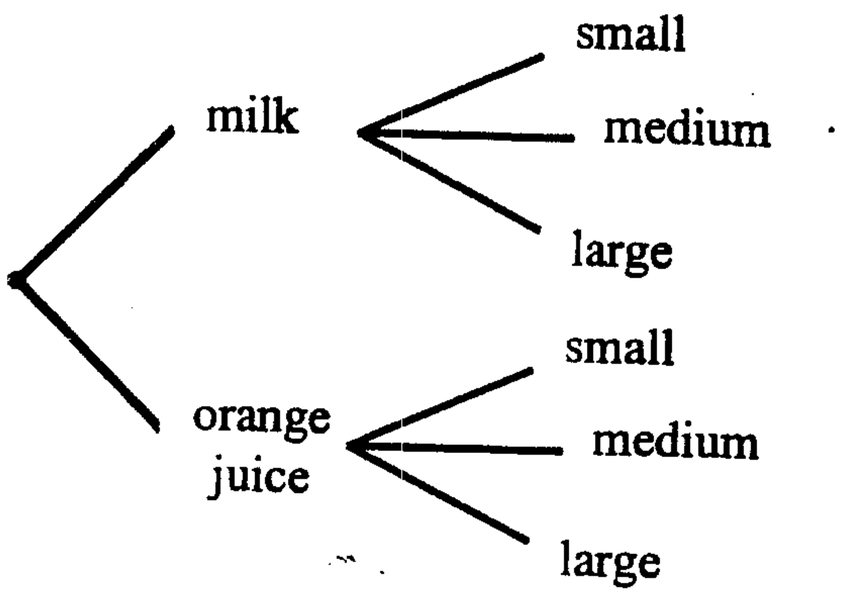
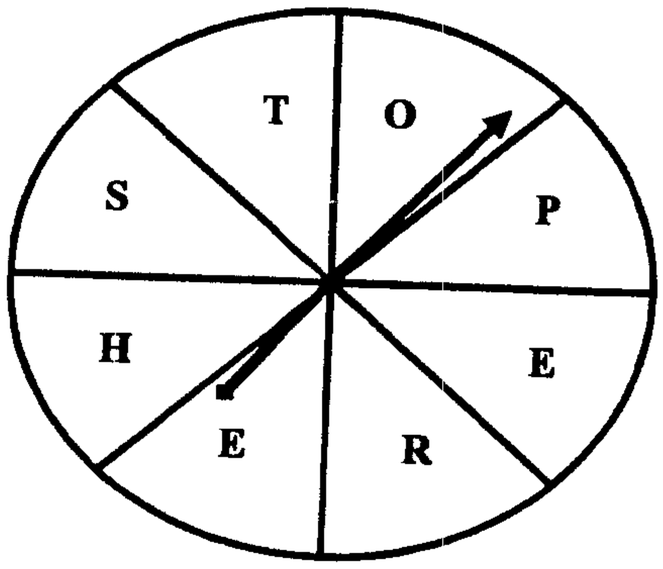
1. **Here is a tree diagram that shows all the different ways you can order milk and orange juice at the Breakfast Bar.**



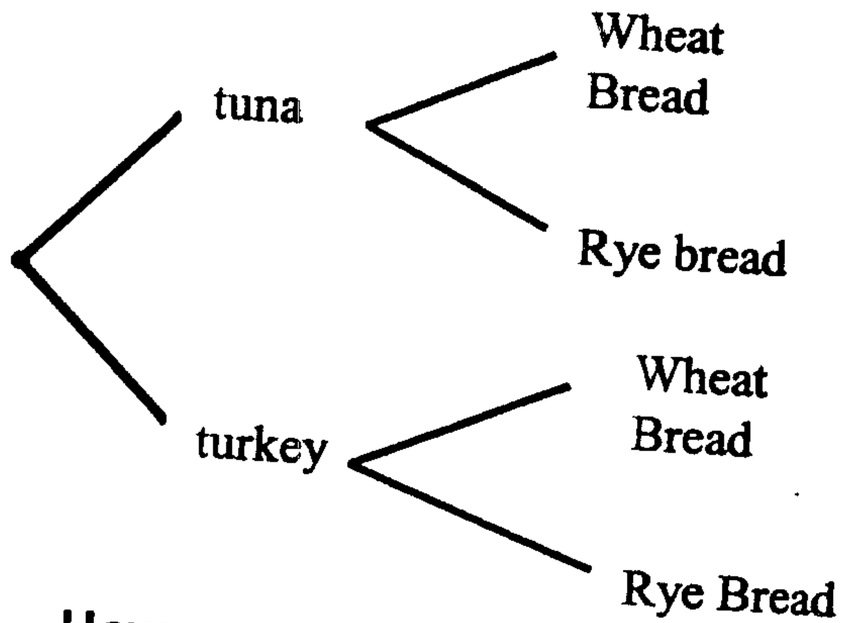
How many different drink orders are available?

A 2
B 4
C 6
D 9

Use the spinner below to answer questions 3-5



2. **The following tree diagram shows the different sandwich combinations available at lunch time.**



How many different sandwich combinations are available at lunch time?

A 2
B 4
C 5
D 8

3. **What is the probability of the spinner landing on "S"?**

A $\frac{1}{2}$ **B** $\frac{1}{6}$

C $\frac{1}{7}$ **D** $\frac{1}{8}$

4. **What is the probability of landing on "E"?**

A $\frac{1}{2}$ **B** $\frac{1}{7}$

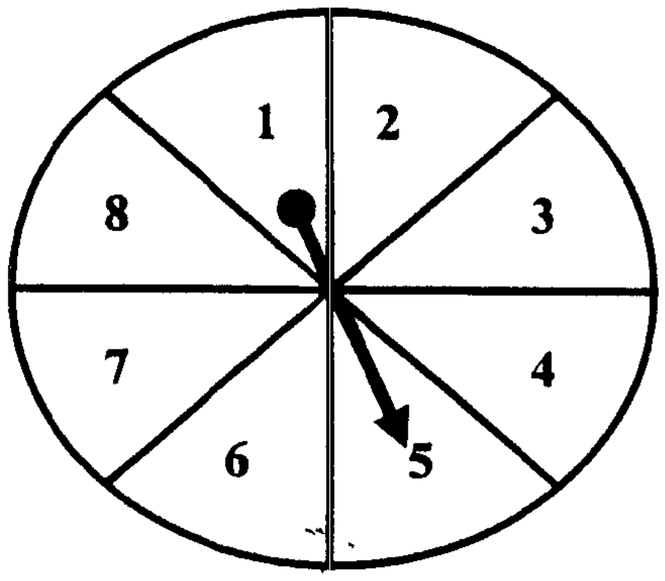
C $\frac{2}{8}$ **D** $\frac{1}{6}$

5. **What is the probability of the spinner NOT landing on "H"?**

A $\frac{7}{8}$ **B** $\frac{1}{8}$

C $\frac{7}{1}$ **D** $\frac{1}{6}$

Use this spinner to answer questions 6-8



6. If Ryan spins the spinner, what is the probability that he will spin a number less than 1?

A 0
B 0.5
C 1
D 100

7. What is the probability that he will spin a number less than or equal to 8?

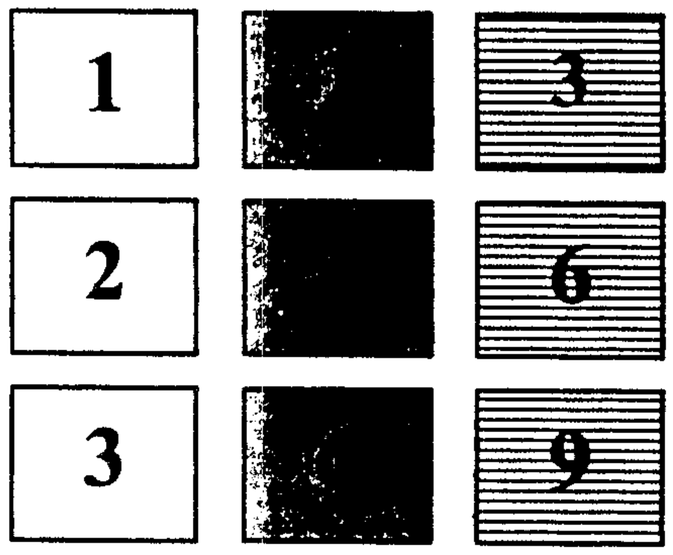
A 0
B 0.5
C 1
D 8

8. What is the probability of spinning a 3 or a 6?

A $\frac{1}{3}$ B 0.25

C $\frac{3}{8}$ D 0.50

These number tiles are mixed in a bag. You pick one from the bag without looking and replace it.



9. What is the probability of picking a striped tile?

A $\frac{3}{9}$ or $\frac{1}{3}$
B $\frac{6}{9}$ or $\frac{2}{3}$
C $\frac{4}{9}$
D $\frac{3}{6}$ or $\frac{1}{2}$

10. If you roll a number cube, the possible outcomes are {1, 2, 3, 4, 5, 6}. What is the probability you will get an even number?

A $\frac{1}{6}$ B $\frac{2}{6}$

C $\frac{3}{6}$ D $\frac{4}{6}$

11. What is the probability of rolling a number cube and getting a 7?

A 1
B 7
C 0
D 2

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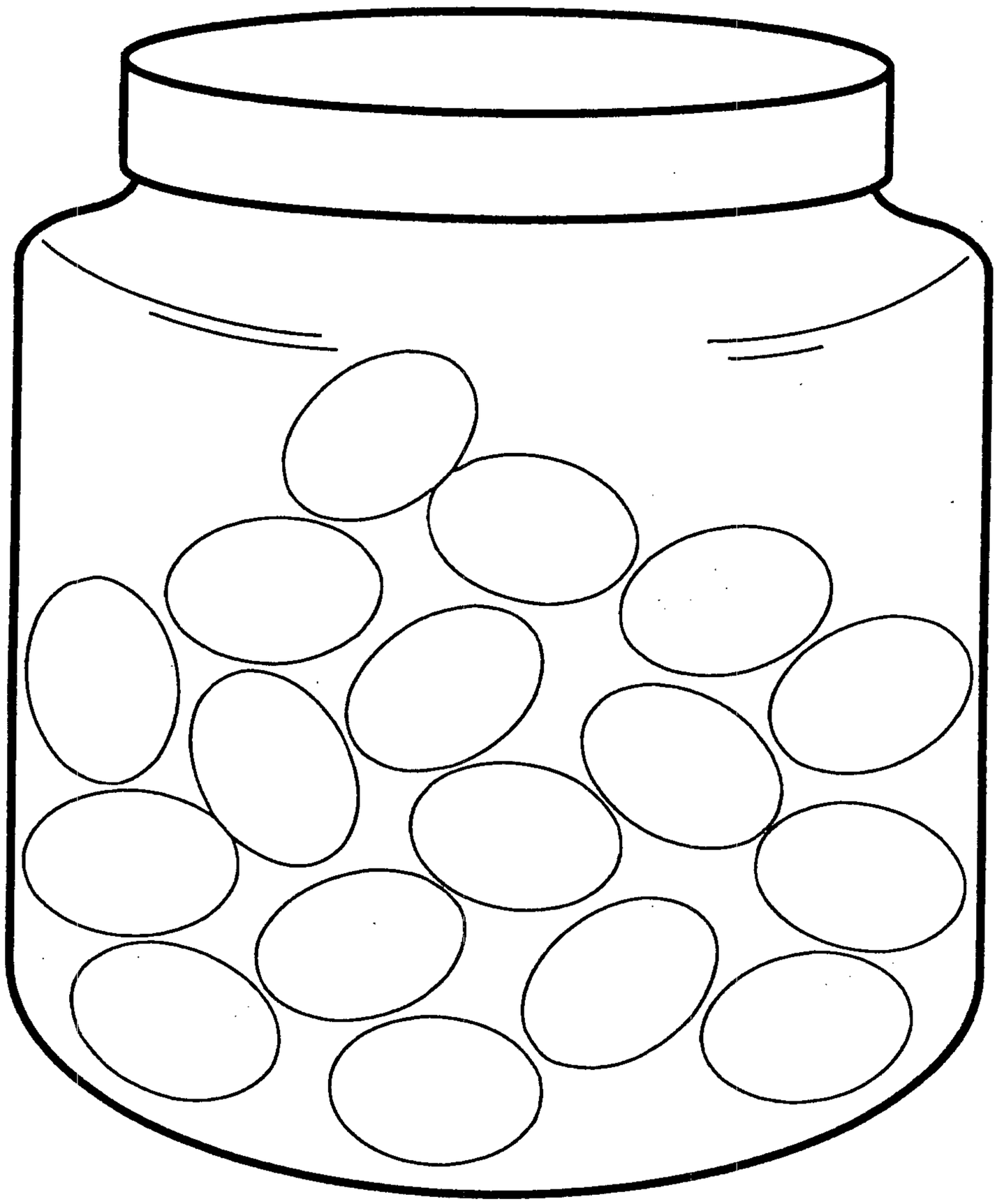
Name _____

JELLYBEAN JUMBLE

Use three different colors to color the jellybeans. Then answer the questions below.



1. If the jar spills, most of the jellybeans will be what color? _____ Why?_____
2. If you reached in to take some jellybeans, what color would most of them be ? _____ Why?_____
   _____

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NAME

SHARPEN YOUR SKILLS

Probabilities

You can be a forecaster. Tell whether you think each event is certain, possible, or impossible.

1. September will have 30 days. _____

2. The sun will rise in the east. _____

3. The team will win the ball game. _____

4. A week will have 8 days. _____

5. A dime will be worth 12 cents. _____

6. The sun will set in the south. _____

7. A quarter will be worth 25 cents. _____

8. It will rain one day this year. _____

9. February will always have 29 days. _____

10. Your birth date will be the same each year. _____

11. A day will have 22 hours. _____

12. One day the temperature will be 55 degrees. _____

13. Someone will be late for school next week. _____

14. May will have 31 days. _____

15. Clocks will have 13 numbers. _____

16. Zero will not be used any more. _____

17. New Year's Day will be the first of January. _____

18. A year will have 12 months. _____

Practice/EXPLORING MATHEMATICS © Scott, Foresman and Company/3

Name _____

Probability Practice

Using the numbers listed below, answer the questions that follow. **Your answers must be listed in the form of fractions.**

4,302	1,925	443
24	90,230	5,789
9,043	3,197	1,002
876	1,339	9,330
929	18,298	14,239
8,213	8,709	7,877

If the numbers listed above were written on cards and picked randomly, what is the probability of picking:

A. a number greater than 50,000 _____

B. a four-digit number _____

C. a number that would round to 20,000 when rounded to the nearest ten thousand _____

D. a number less than 50 _____

E. a number with a zero in the thousands place _____

F. a six-digit number _____

G. a number greater than 1,000 But less than 10,000 _____

H. a number with a four in the tens column _____

J. a three-digit number greater than 500 _____

K. a four-digit number greater than 4,550 _____

Name _____ Activity Worksheet 25

Heads and Tails

Toss a coin 10 times. Mark an X in a box next to "Head" if it lands heads up, or mark a box next to "Tail" if it lands tails up. Then write the total number of times it landed on each side.

TOSS	1	2	3	4	5	6	7	8	9	10	TOTAL
HEAD											
TAIL											

Toss the coin 10 more times.

TOSS	1	2	3	4	5	6	7	8	9	10	TOTAL
HEAD											
TAIL											

Toss the coin 10 more times.

TOSS	1	2	3	4	5	6	7	8	9	10	TOTAL
HEAD											
TAIL											

How many times above did the coin come up heads? _____ tails? _____
What do you notice about the results? Do you think that tossing a coin to decide a question is fair? Why or why not?

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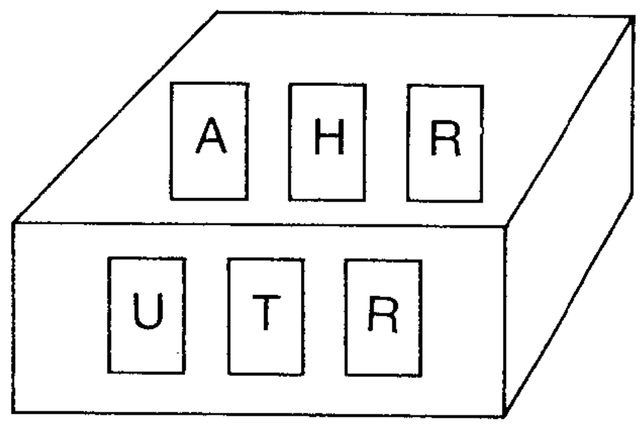
NAME

SHARPEN YOUR SKILLS

Fractions and Probability

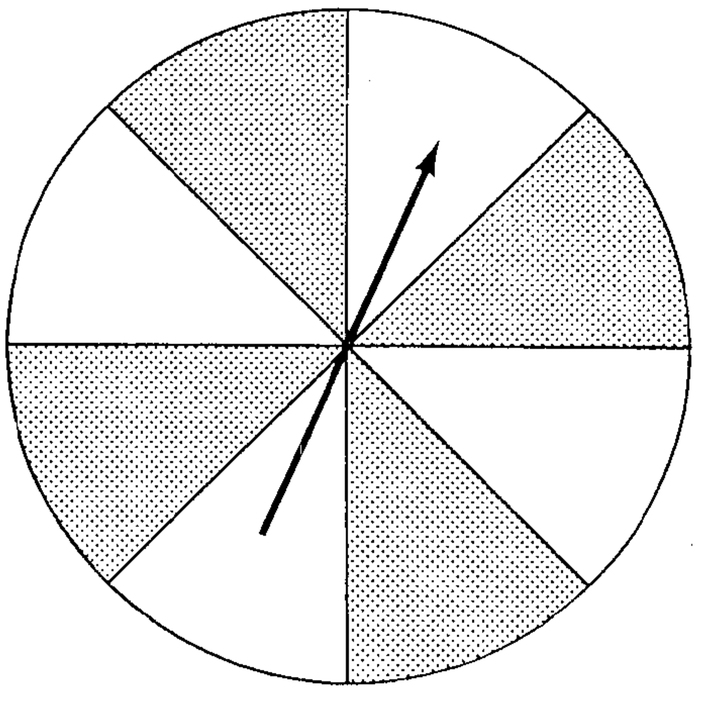
Arthur put 6 letter cards into a box.



1. What is the probability of picking an R? $\frac{1}{3}$

2. If Arthur picked a card from the box 15 times, replacing the card each time, how many times is he likely to pick an R? _____

There are 8 spaces on this wheel. _____ spaces are shaded and _____ spaces are unshaded.

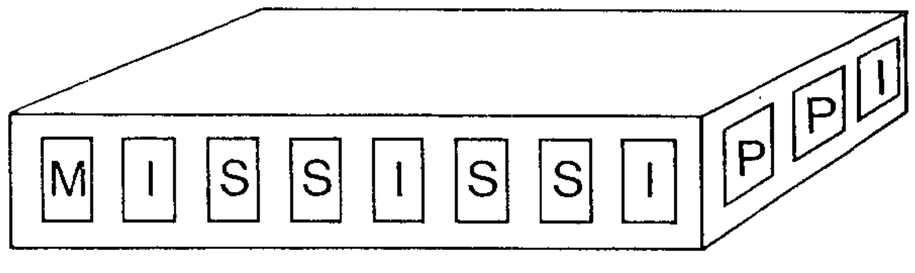


3. What is the probability of the spinner landing on a shaded space? _____

4. What is the probability of the spinner landing on an unshaded space? _____

5. If there are 40 spins of the wheel, how many times would you expect the spinner to land on a shaded space? _____

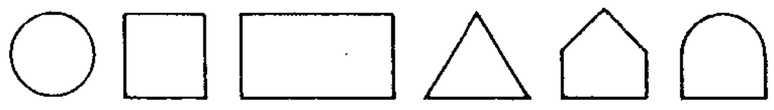
These letter tiles are placed in a box.



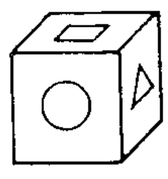
6. What is the probability of picking:

M _____ **S** _____ **I** _____ **P** _____

7. If 11 picks are made, replacing the tile each time, about how many would be I? _____

These shapes  appear on the 6 faces of a cube. When the cube is rolled, all the faces have the same chance of coming up.

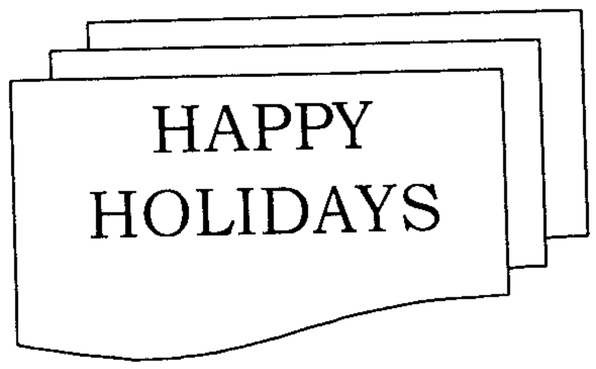
8. Find the probability of getting each result on one roll of the cube. _____



9. What is the probability of getting a shape with 4 sides? 3 sides? 5 sides?

_____

Practice/**EXPLORING MATHEMATICS** © Scott, Foresman and Company/5



Santa loves math and makes sure his elves know all about important math concepts. He loves to teach the elves about probability using Christmas items. Read each problem and write the answer in the space provided.

Santa has the letters that spell **HAPPY HOLIDAYS** in a small sack. The elves cannot see what is in the sack. Use this information to answer the following questions.

What is the probability of Santa pulling the following letters from his bag?

The letter H _____ The letter P _____

A vowel _____ A consonant _____

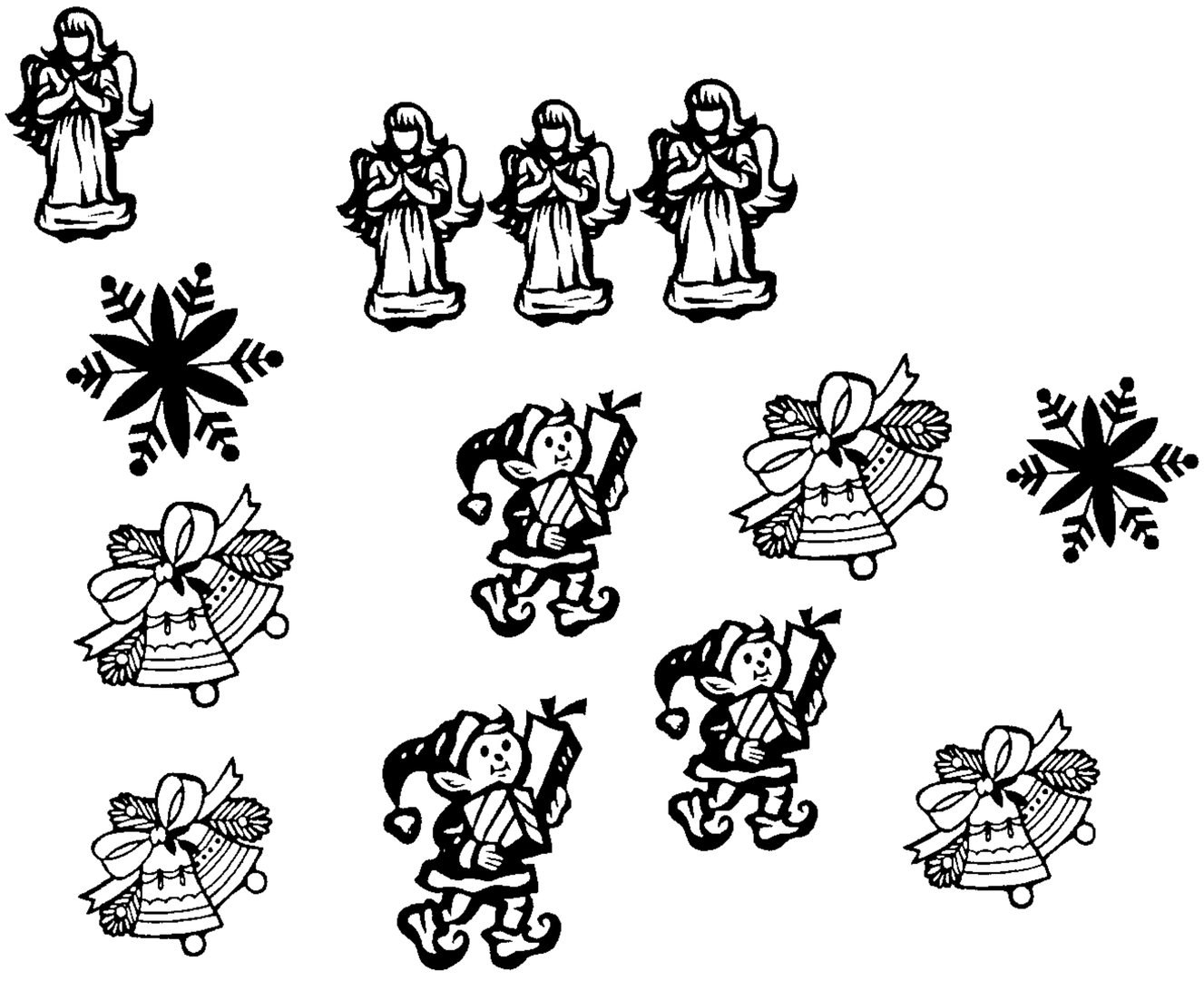
A letter that comes after E in the alphabet. _____

A letter that comes before Z in the alphabet. _____

A letter that comes after D but before Q _____

A letter that comes after F, but before R _____

The ornaments pictured below are in a bag. If you don't look as you reach in to pull out an ornament, what are the chances that you will pick



Angel_____

Elf _____

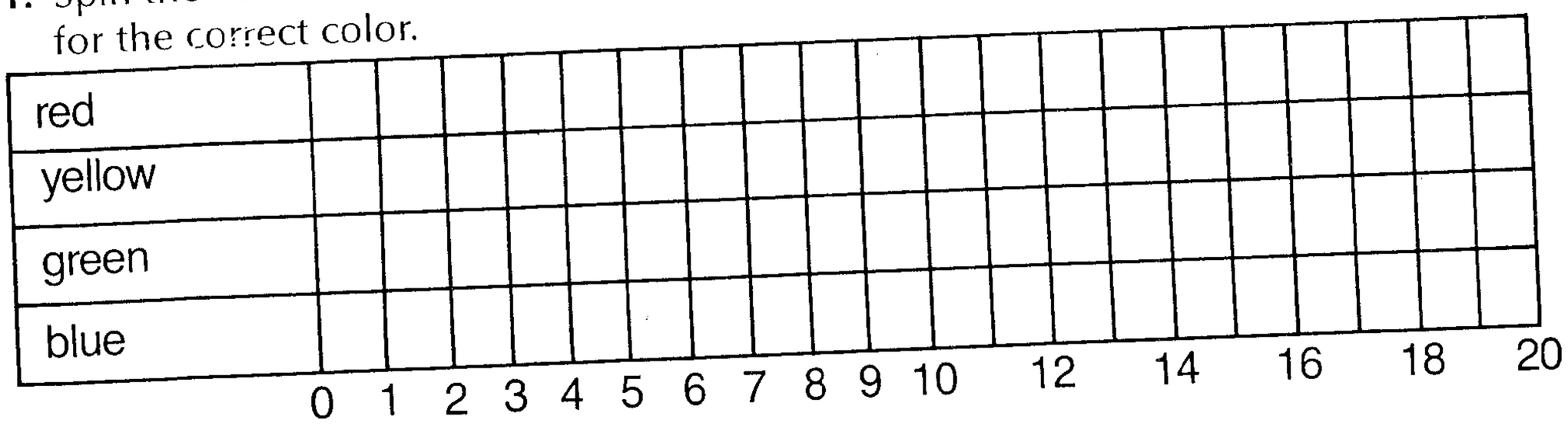
Snowflake _____

Bells _____

Name _____ Activity Sheet 45

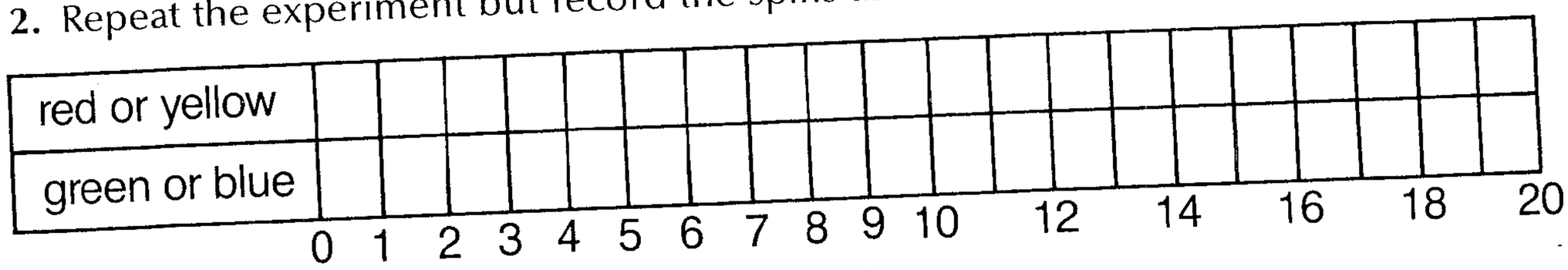
Using a Color Spinner

1. Spin the color wheel 48 times. After each spin, color a box on the graph for the correct color.

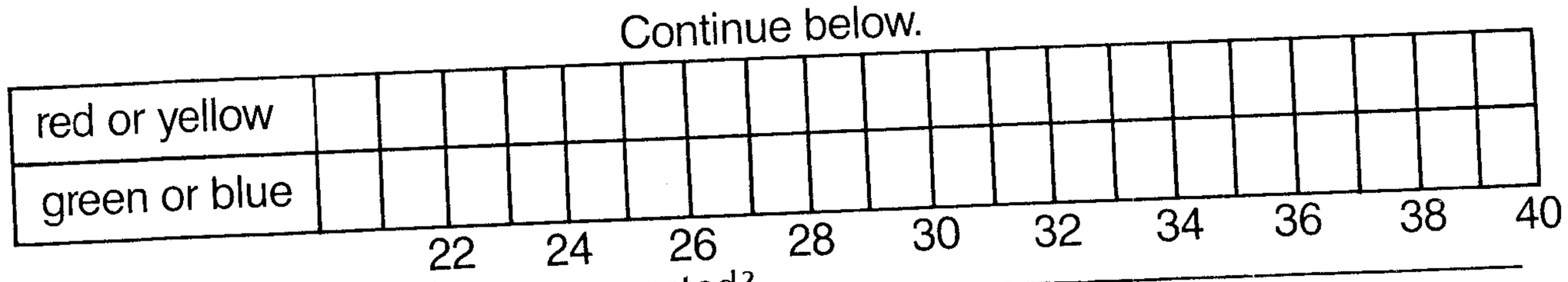


Are the results about what you expected? _____

2. Repeat the experiment but record the spins as shown.

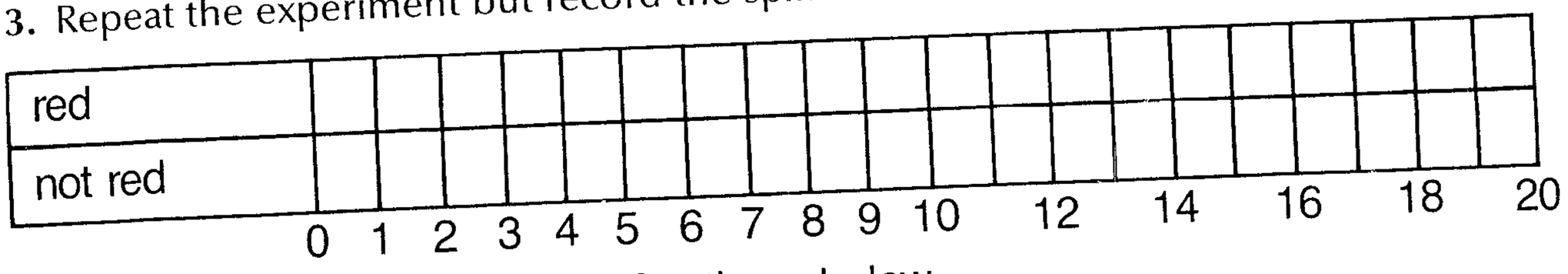


Continue below.

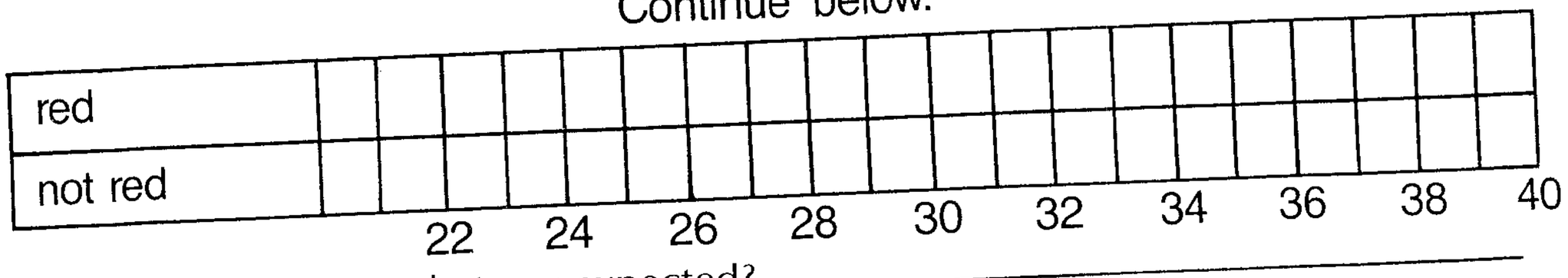


Are the results about what you expected? _____

3. Repeat the experiment but record the spins as shown.



Continue below.



Are the results about what you expected? _____

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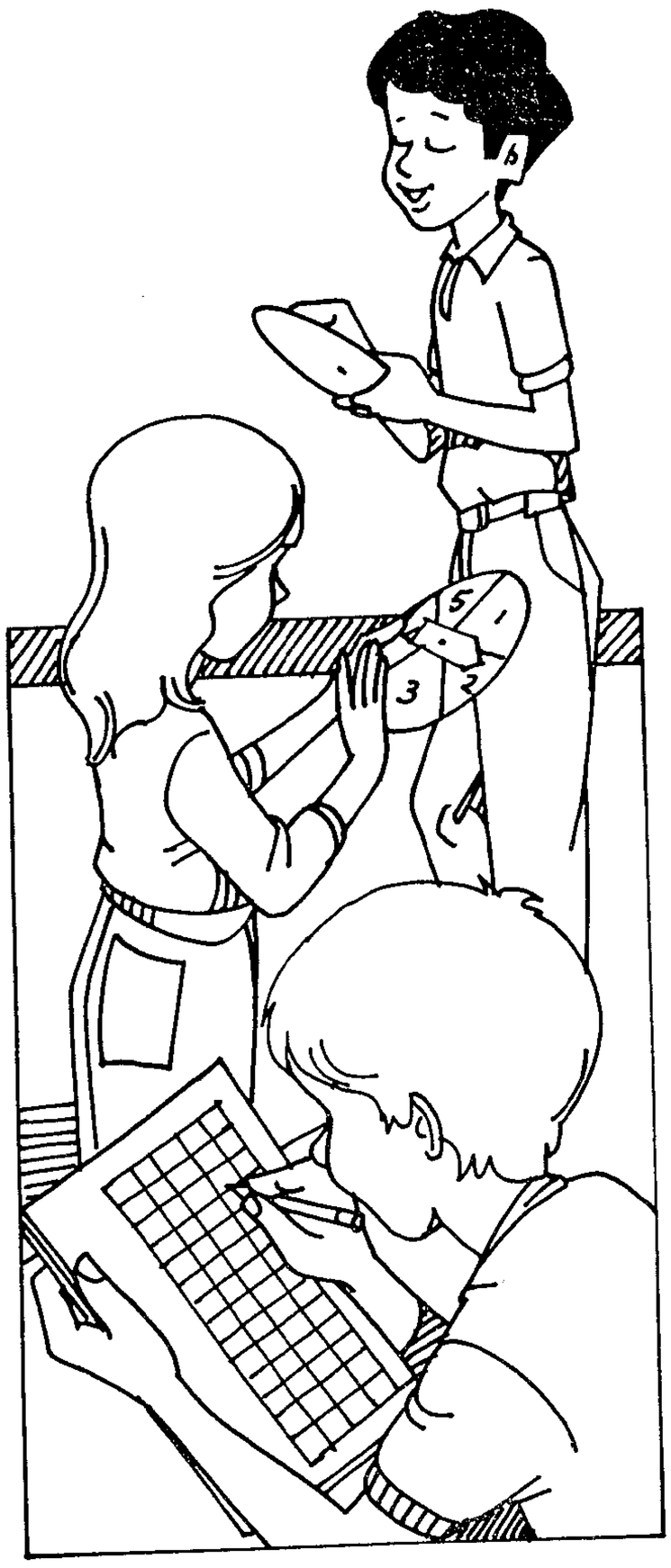
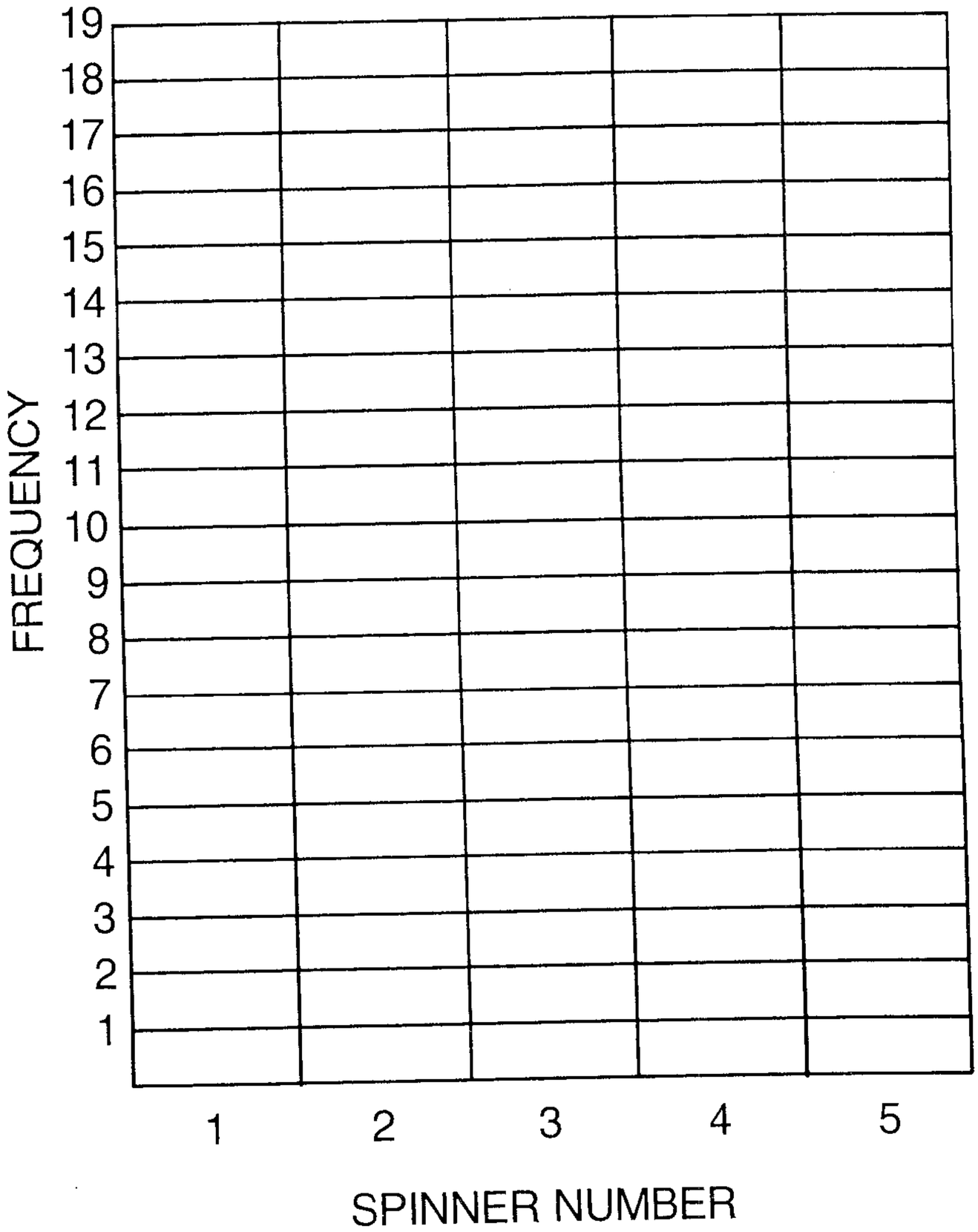
Name _____ Activity Worksheet 46

Using a Number Spinner

Spin the number wheel 100 times. After each spin, color a box on the graph for the correct number.





What do you notice about the results? _____

_____. Are your results the same as the probable results? _____

If not, what could be the reason? _____

Macmillan Publishing Company Intermediate Kit

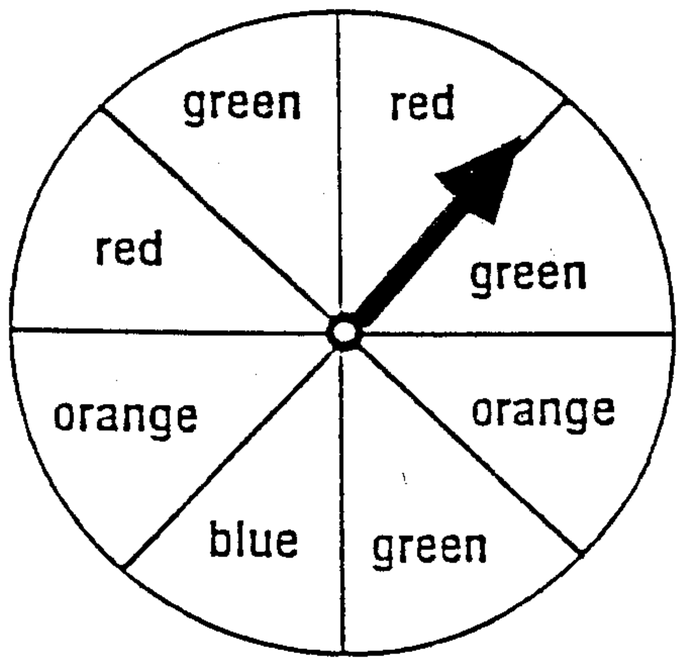
Name: _____

SOL Checkpoint Test

5.14 The student will

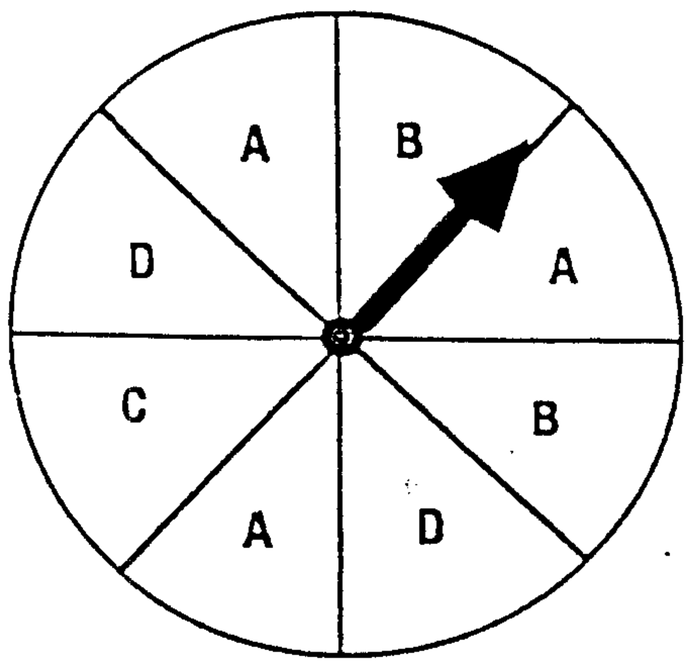
- solve problems involving the probability of a single event by using tree diagrams or by constructing sample spaces representing all possible results; and
- create a problem statement involving probability based on information from a given problem situation. Students will not be required to solve the problem created.

1. What is the probability that the spinner will stop on the color green?



A. 3/8
B. 1/8
C. 2/8
D. 1/2

2. If the spinner is spun once, what is the probability of not getting a D?



A. 1/3
B. 1/6
C. 1/2
D. 3/4

3. Jerry has 4 pennies, 2 dimes, and 3 pennies in his piggy bank. If Jerry reaches in and takes out just one coin, what is the probability that it is a dime?

A. three
B. three out of six
C. three out of nine
D. two out of nine

4. The weather forecasters on Channel 3, Channel 10, and Channel 13 all predict a 75% chance of rain for Wednesday afternoon. What is the probability of rain on Wednesday?

A. 1/2
B. 1/4
C. 3/4
D. 2/3

5. The local radio station is giving away free concert tickets. The final draw is limited to the ten names listed below. What is the probability that the name picked from a box will start with the letter "B"?

Betty	Bob	Ben	Holly	Maureen
Rachel	Gary	Dennis	Blanche	Patricia

A. 1/10
B. 3/10
C. 2/5
D. 1/5

6. The delicatessen offers all customers a choice of tuna, pastrami, turkey, or veggie sandwiches. Customers can choose between wheat and white bread. What are the possible choices?

A. Tuna on white bread
Pastrami on white bread
Turkey on white bread
Veggie on white bread

B. Tuna on wheat bread
Pastrami on wheat bread
Turkey on wheat bread
Veggie on wheat bread

C. Tuna on white bread
Pastrami on wheat bread
Turkey on wheat bread
Veggie on white bread

D. Tuna in white bread
Pastrami on white bread
Turkey on white bread
Veggie on white bread
Tuna on wheat bread
Pastrami on wheat bread
Turkey on wheat bread
Veggie on wheat bread

7. Thomas plays basketball every Tuesday after school. Thomas makes four foul shots for every seven tries. What is the probability he will miss the next foul shot?

A. 4/7
B. 3/7
C. 3/8
D. 1/4

8. Lisa buys lunch each and everyday in the school cafeteria. She can choose a hamburger, a taco, or a soup with milk, soda, juice, or tea as the accompanying beverage. What is the list of all the possible combinations that Lisa could choose for lunch?

A. Hamburger / Milk
Hamburger / Juice
Hamburger / Soda
Hamburger / Tea

B. Hamburger / Milk
Hamburger / Juice
Taco / Milk
Hamburger / Soda
Hamburger / Tea
Soup / Milk

C. Hamburger / Milk
Hamburger / Juice
Taco / Milk
Soup / Juice
Hamburger / Soda
Hamburger / Tea
Taco / Soda
Soup / Tea

D. Hamburger / Milk
Hamburger / Juice
Taco / Milk
Taco/ Juice
Soup / Milk
Soup / Juice
Hamburger / Soda
Hamburger / Tea
Taco / Soda
Taco / Tea
Soup / Soda
Soup / Tea

9. What is the probability of choosing a number without looking, that does not have the number ④ on it?

⑧ ⑥ ⑤ ⑤ ④ ①

① ② ⑧ ④ ④ ⑦

A. 3/4
B. 1/3
C. 7/12
D. 5/12

10. A drawer is filled with 7 black socks and 5 white socks. Martin pulls one sock without looking in his sock drawer. Which statement best describes the outcome?

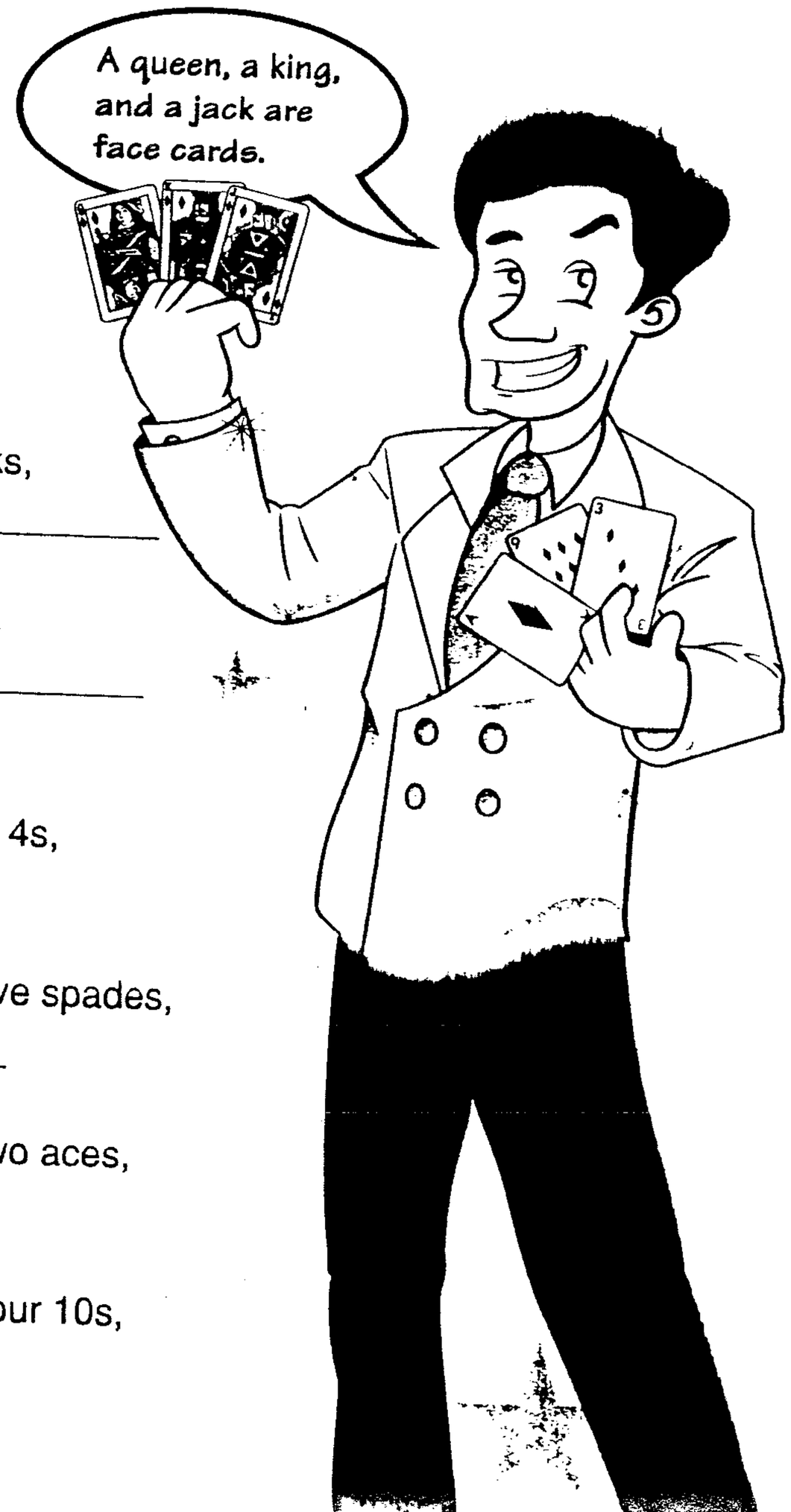
A. Martin is more likely to get a black sock.
B. Martin is more likely to get a white sock.
C. Martin is as likely to get a black sock as a white sock.
D. It is impossible to get a white sock from the drawer.

Name _____ 5.14

Probability

Play Your Cards Right!

Solve. Write each answer in simplest form.



1. What is the probability of drawing a 7 from a player who has three 8s, one queen, one 7, one 5, and one 4? _____

2. What is the probability of drawing a spade from a player who has five spades, four hearts, and one club? _____

3. What is the probability of drawing a king or queen from a player who has four jacks, four queens, and four kings? _____

4. A deck of cards has 13 hearts, 13 clubs, 13 spades, 13 diamonds, and two jokers. What is the probability of drawing a joker? _____ A diamond? _____ A club or a spade? _____

5. What is the probability of drawing a card greater than 4 from a player who has two 4s, three 7s, one 5, and four 3s? _____

6. What is the probability of drawing a red card from a player who has eight hearts, five spades, four diamonds, and three clubs? _____ A black card? _____

7. What is the probability of drawing a face card from a player who has three kings, two aces, one queen, and two jacks? _____

8. What is the probability of drawing a card that is not an ace from a player who has four 10s, three queens, two 6s, two aces, and one 4? _____

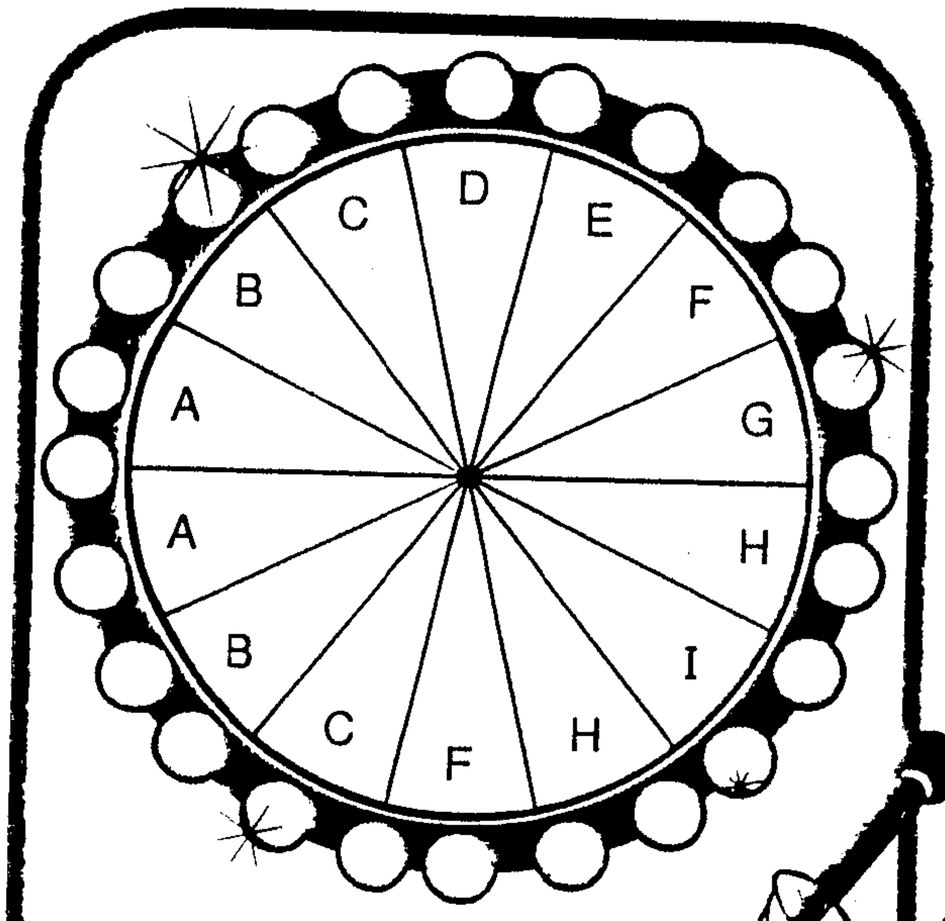
Name _____

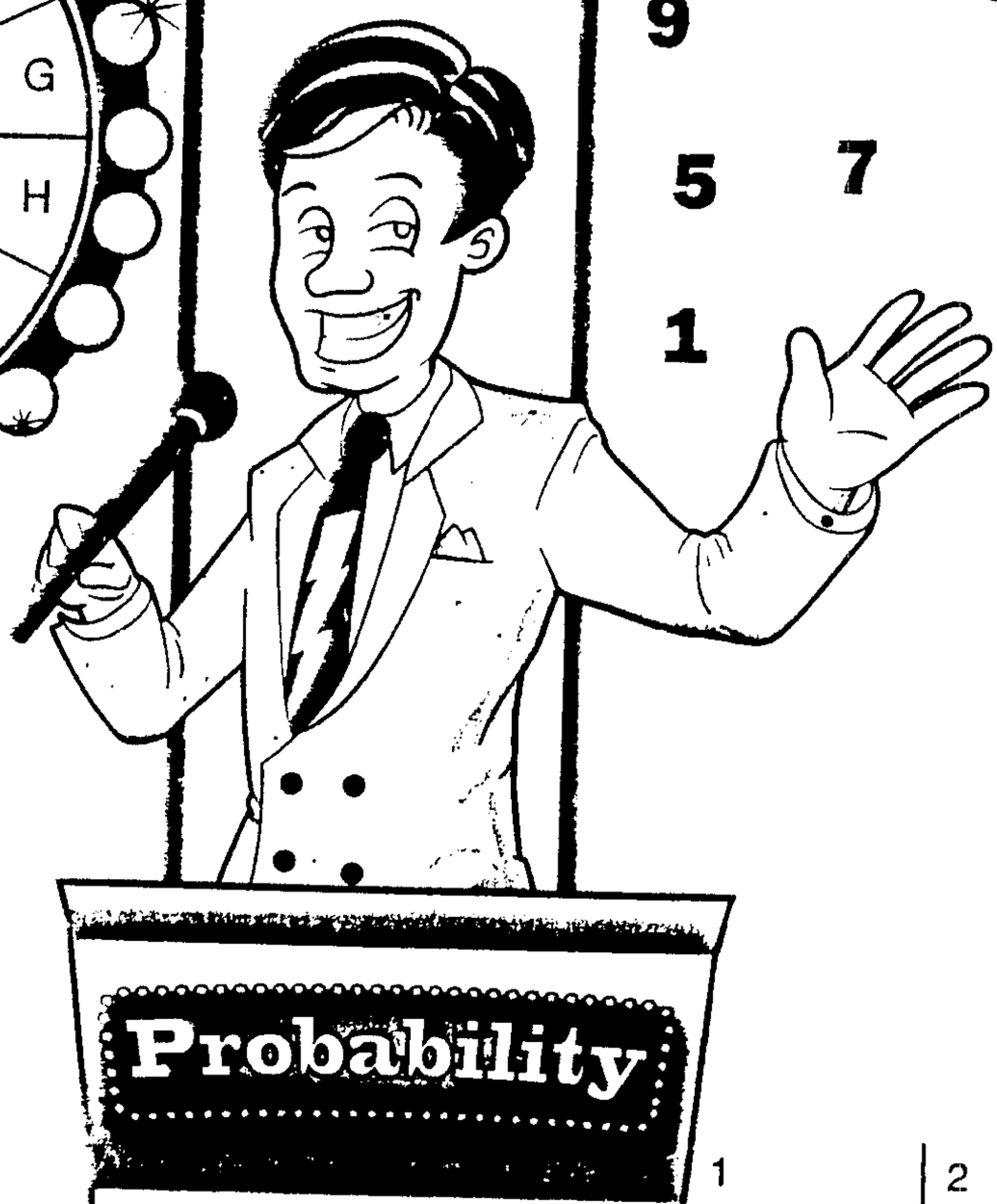
Probability

Tic-Tac-Toe

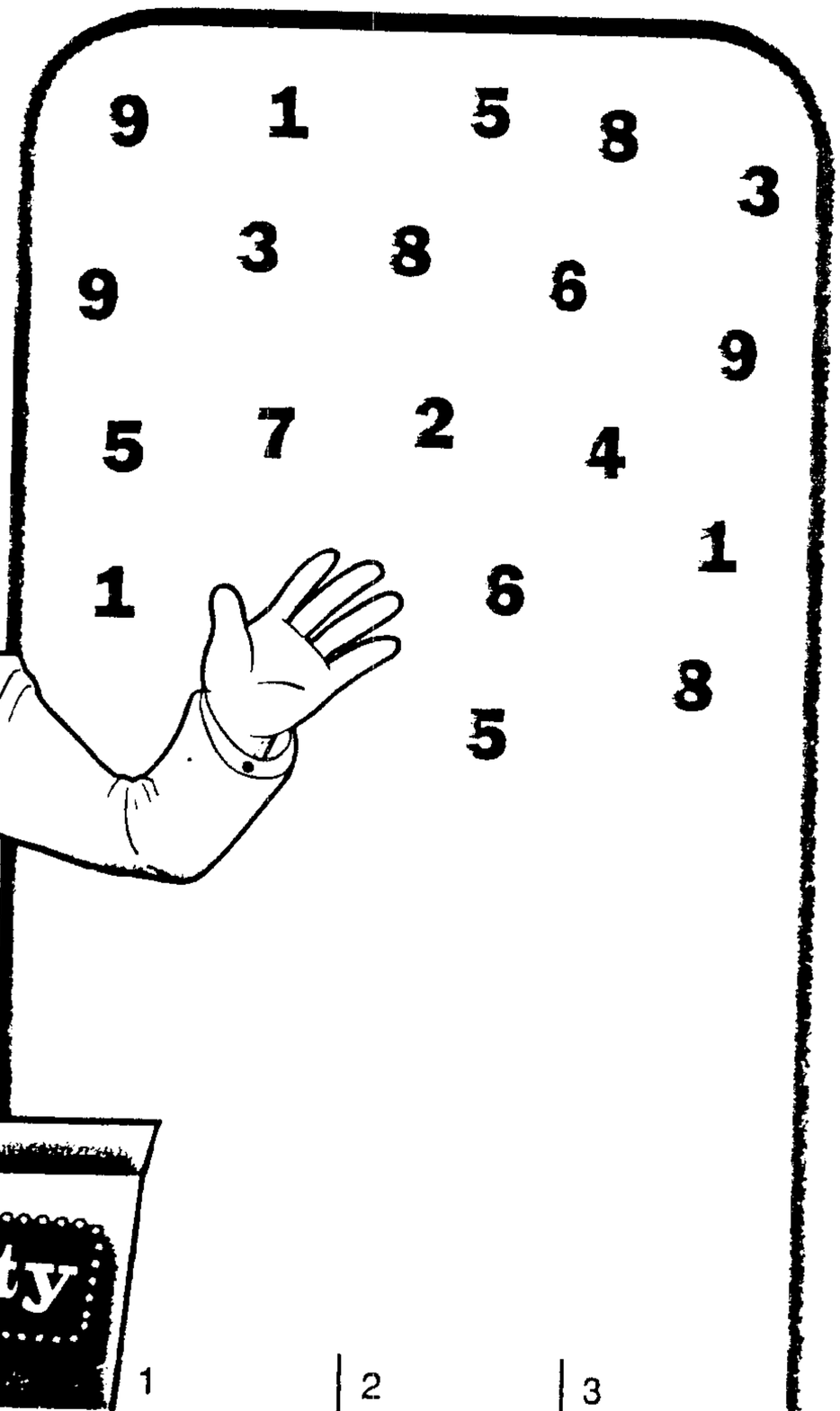
5.14

In each box of the first grid below, write the probability of spinning that letter on the wheel.
In each box of the second grid below, write the probability of choosing that number from the box.
Circle the three matching answers that are in a row, in a column, or on a diagonal in each grid.





A	B	C
D	E	F
G	H	I



1	2	3
4	5	6
7	8	9

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Name _____ 5.14

Completing a tree diagram

What's Polly's Pleasure?

Add one flavor and one type of nut to each batch of cookie dough. Complete the tree diagram to find all the possible combinations of ingredients. The first one has been done for you.

Cookie Dough	Flavorings	Nuts
sugar cookie (SC)	chocolate (CH)	pecans (P)
animal-shaped cookie (AC)	cinnamon (C)	walnuts (W)
	butterscotch (B)	almonds (A)

Cookie Dough	Flavoring	Nuts	Combinations
SC	CH	P	sugar cookie, chocolate, pecans

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Name_____ Probability and Tree Diagrams 5.14

HAPPY VALENTINE'S DAY

Part 1: If the letters above were placed in a bag, what would be the probability, expressed as a FRACTION, of pulling out...

1) a V? _____ 2) an A, E, I, O, or U? _____

3) a P?_____ 4) a Y?_____

5) an A or N?_____ 6) a consonant?_____

7)one of the 1st 12 letters of the alphabet? _____

8) a B?_____ 9) an L,M,N,O,or P?_____ 10) an S or T?_____

Part 2: Tree Diagrams...

Construct a tree diagram to show all of the possible combinations.

1) Shoes: Converse Socks: Purple

Vans Green

Boots Rainbow

2) Cake flavor: Chocolate Icing: Vanilla

Strawberry Whipped

Yellow Chocolate

Part 3: How many outcomes are possible?

1) 3 kinds of crust, 2 kinds of sauce, 5 kinds of toppings—
How many different pizzas? _____

2) 4 kinds of ice cream, 6 kinds of candy, 4 kinds of sauces—
How many different sundaes?_____

Part 4: Construct a sample space by listing all possible outcomes...

1) when a coin is flipped-_____

2) when a letter is picked out of a bag containing the letters in the name of this month-_____

3) when a regular, 6-sided die is rolled- _____

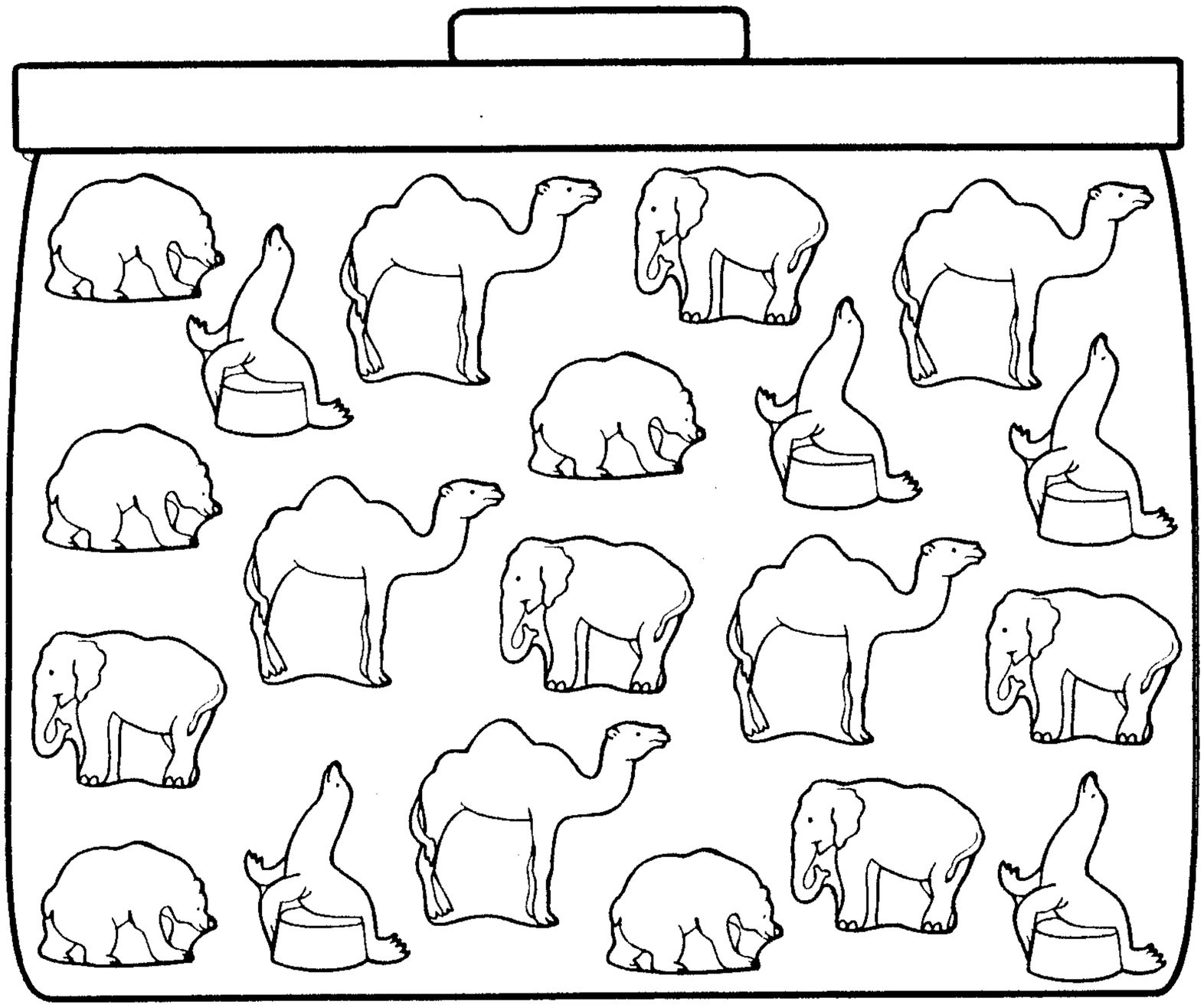
4) when a day of the week is picked out of a hat- _____

_____

Name _____ Determining the probability of a simple event

Cookie Colors

Follow the directions. Then answer the questions.



Directions

1. Color one cookie yellow.
2. Color four cookies blue.
3. Color five cookies red.
4. Color ten cookies green.

1. How many cookies are there in all? _____

2. What is the probability of pulling each color of cookie out of the cookie jar? Record your answers in word form and fraction form.

	Words	Fraction
yellow	_____	_____
blue	_____	_____
red	_____	_____
green	_____	_____

3. Which color of cookie are you most likely to pull from the jar? _____

4. Which color of cookie are you least likely to pull from the jar? _____

5. Are you more likely to pull out a blue cookie or a red cookie? _____

   Why? _____

6. Suppose you pulled two cookies from the cookie jar. Cross out the outcome below that is impossible. Circle the outcome that is most likely to occur.

two blue cookies two yellow cookies two green cookies

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Note to the teacher: Each student will need crayons in the following colors to complete this page: yellow, blue, red, and green.

Go Fish!

A visit to the fish pond puts students in the swim with probability. To prepare, cover the sides of a large cardboard box with blue paper. Securely tie one end of a yarn length to a ruler and the other end to a horseshoe magnet. Then cut out 20 paper fish: ten green, six yellow, three blue, one red. Tape a paper clip to the mouth of each cutout.

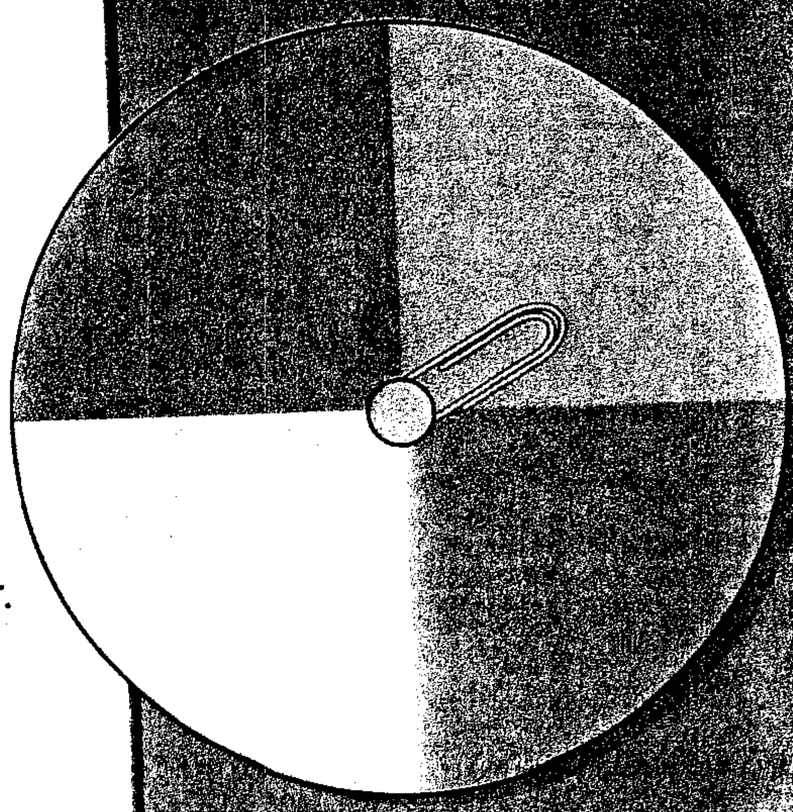
As you put each color of fish in the pond, have students count the cutouts and record the information on a copy of "Go Fish!" from page 148. Next, have each child decide which color fish will be caught most often and write his prediction on his paper. (Clarify that each fish caught is immediately returned to the pond.) Then send pairs of students to the pond to test their predictions. For easy management, have Partner 1 fish and Partner 2 tend the pond. When Partner 1 catches a fish, he writes its color on his paper and then he returns the fish to the pond. (If more than one fish is caught, he writes the color of the fish that appears to have been caught first.) Partner 2 mixes the fish in the pond and then Partner 1 resumes fishing. When Partner 1 has 20 catches recorded, he trades places with Partner 2, and they repeat the activity. Then each child uses his data to complete his paper.

When the entire class has gone fishing, ask students to share the results of their fishing expeditions. Use this data to make a class graph that shows the color of fish most frequently caught by your young anglers.

In a Spin

At this carnival game youngsters put a spin on probability! To make a game spinner, a child folds a six-inch, white construction paper circle in half and then in half again. She unfolds the circle and uses one or more of the following colors to color the four sections: red, blue, yellow, green. Emphasize that it is not necessary to use all four colors. Then she threads a brad through the opening of a paper clip and loosely fastens the brad in the center of the circle so that the paper clip spins freely.

Divide students into four teams and assign each team a different color (making sure that each group member has the color on her spinner). Challenge each team to predict which team member will be first to spin the assigned color ten times. Have each team share its prediction with the class and the reasoning behind it. Next, ask each child to list on provided paper the colors on her spinner. Repeatedly announce "Spin. [pause] Record." Following your lead, each child spins her spinner and then records on her paper the color on which it stopped. Continue in this manner until one or more teams has a winner. Ask each group to report its findings to the class. If time permits, assign new team colors and play the game again!



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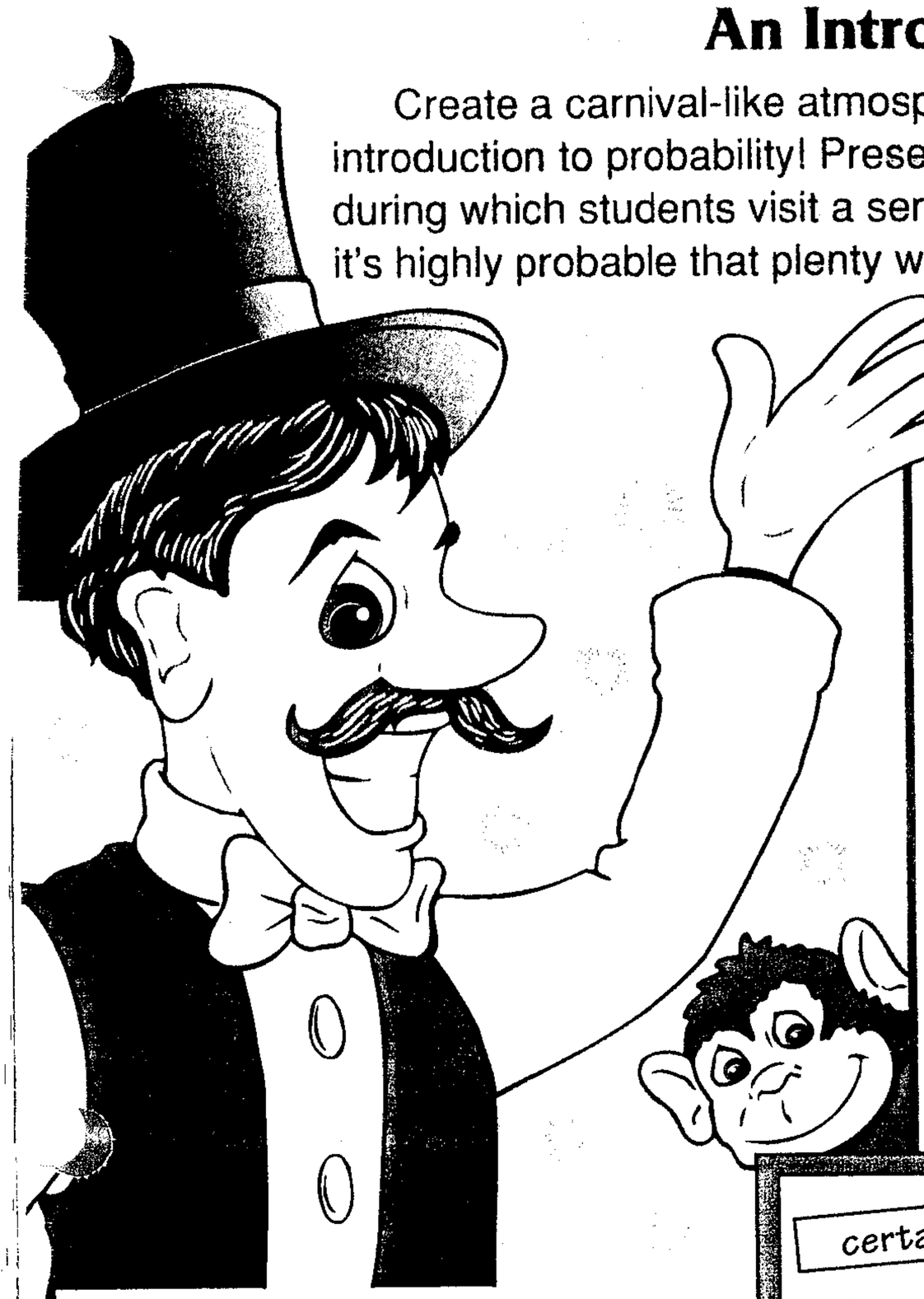
What Are the Odds?

An Introduction to Probability

Create a carnival-like atmosphere with these hands-on activities that double as an introduction to probability! Present one activity per day or plan a probability carnival during which students visit a series of adult-supervised learning stations. Either way, it's highly probable that plenty will be learned and a great time will be had by all!

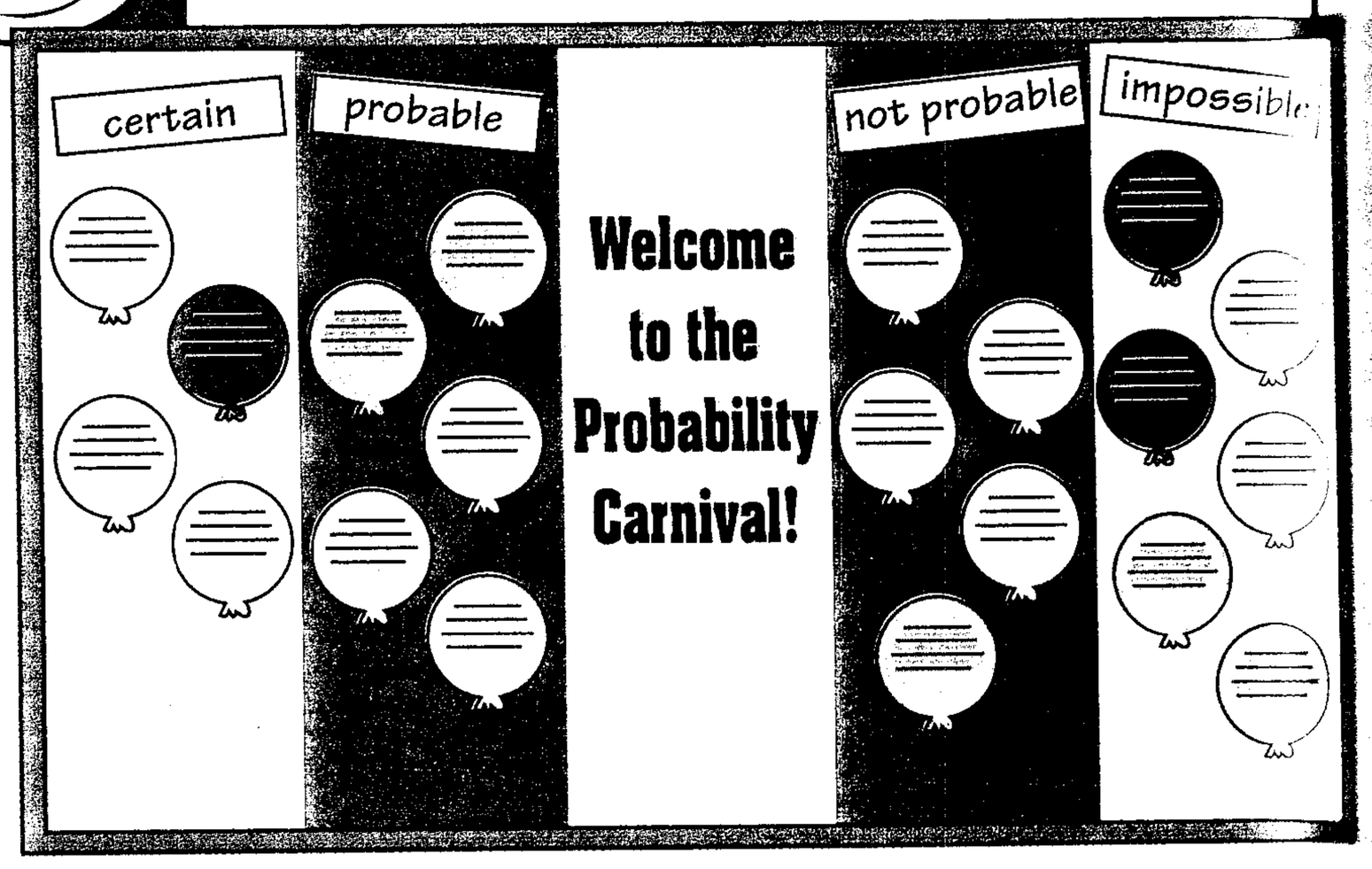
ideas by Stacie Stone Davis



For Openers

Open your probability carnival with an activity that explores the concepts of *certain, probable* (or *likely*), *not probable* (or *not likely*), and *impossible.* Use alternating colors of paper to divide a bulletin board into five sections and then add the title and labels shown. When students have a clear understanding of the four posted terms, give each child a colorful balloon pattern on which you've written a different event. (See the provided list for suggestions.) Ask students to cut out the patterns. Then have each child, in turn, read aloud the event from his balloon and determine the probability that the event will occur for him. Then post the cutout on the display in the corresponding category.

Lead students to understand that probability is the chance or likelihood that an event will happen. Also help them conclude that the probability of an event occurring may not be the same for every person.



Events

You will feed an elephant today.
You will have homework tonight.
It will rain today.
You will read from a book today.
You will ride in an airplane this week.
You will eat ice cream this week.
It will snow this weekend.
You will have a birthday this month.
You will watch TV today.
You will ride a bus today.
The wind will blow today.
You will brush your teeth today.
You will get a phone call this week.
You will get a letter in the mail this week.

Probability Pointers

Mathematically speaking, a probability is a ratio that tells how likely it is that an event will occur. The probability that a flipped coin will land on tails is 1:2—one chance in two that it will occur. The probability that a tossed die will reveal the number two is 1:6—one chance in six that a two will be rolled. It is doubtful that the results your youngsters gather will support expected probability. This is because the students are recording a small amount of data. The Law of Large Numbers maintains that a small number of trials will yield a wide range of results, which may or may not be close to the expected probability. On the other hand, a large number of trials will give results that are quite close to the expected probability. When investigating probability, it is important for students to understand that there are uncertainties and limitations involved when drawing conclusions from the data that is collected.