Chapter 10

Lesson 1

Name _____ Date _____

Finding Combinations of Attributes

NCTM Standards 1, 2, 6, 7, 8, 9, 10

Describe all the cards that could be made for each setting. You might not need all the spaces.

1. Figure = 

_____ _____

_____ _____

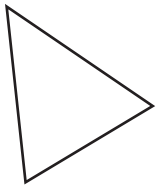
_____ _____

2. Color = green

_____ _____

_____ _____

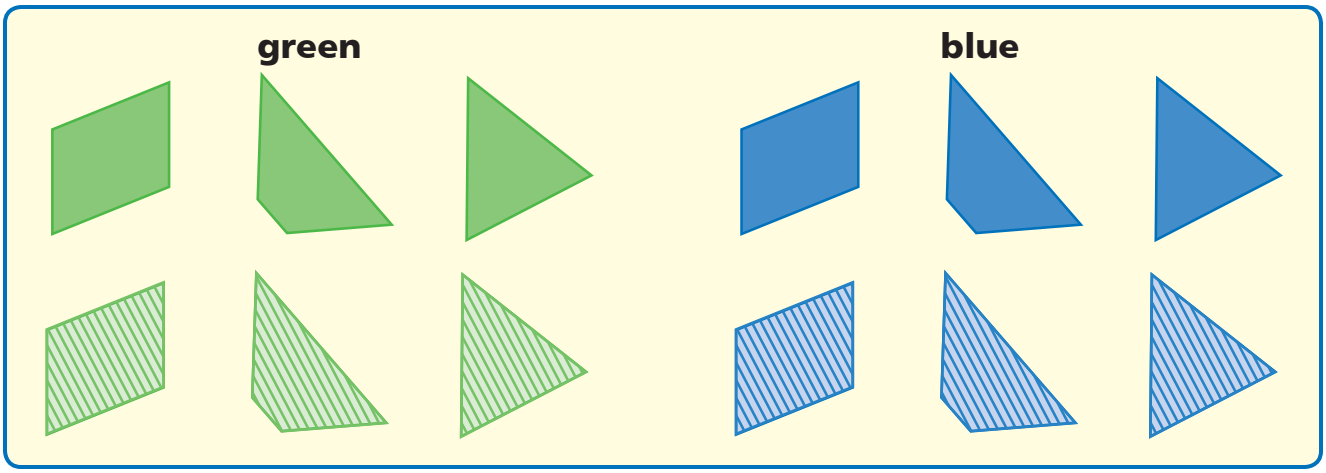
_____ _____

3. Shading =  ; Figure = 

_____ _____

_____ _____

_____ _____



Answer the questions about the cards.

4 What portion of the cards

are green? ____ out of ____

What portion of the cards

have a triangle? ____ out of ____

What portion of the cards have

a green triangle? ____ out of ____

5 What portion of the cards

have polka dots? ____ out of ____

What portion of the cards

have a trapezoid? ____ out of ____

What portion of the cards have a

polka-dot trapezoid? ____ out of ____

6 What portion of the cards have a parallelogram? ____ out of ____

What portion of the cards have a solid blue figure? ____ out of ____

What portion of the cards have at least one of these attributes: a parallelogram or a solid blue figure? ____ out of ____

7 Challenge

What portion of the cards do not have a triangle? ____ out of ____

What portion of the cards are not green? ____ out of ____

What portion of the cards are green and do not have a triangle? ____ out of ____

What portion of the cards have at least one of these attributes: green or no triangle? ____ out of ____

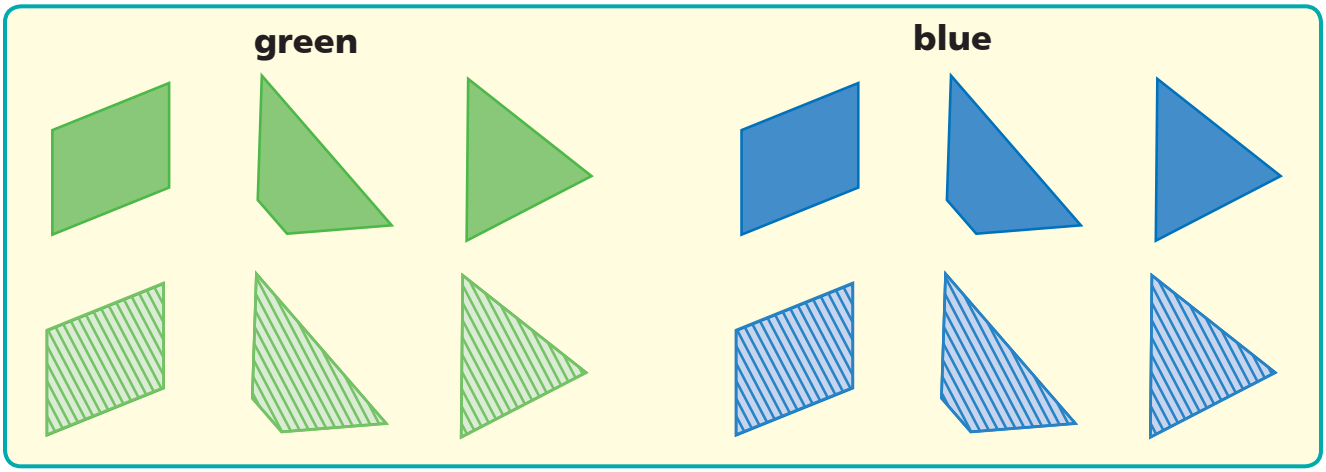
Chapter 10

Lesson 2

Name _____ Date _____

Describing the Likelihood of an Event

NCTM Standards 1, 2, 6, 7, 8, 9, 10



1. What portion of the cards have parallelograms? ____ out of ____

   Write your answer as a fraction. _____

2. What portion of the cards are blue or green? ____ out of ____

   Write your answer as a fraction. _____

3. What portion of the cards are blue or solid-colored or both? ____ out of ____

   Write your answer as a fraction. _____

Label these possibilities *certain, likely, unlikely,* or *impossible,* using your answers to the above questions.

4. choosing a card with a parallelogram _____

5. choosing a card that is blue or green _____

6. choosing a card that is blue or solid or both _____

Label these possibilities *certain, likely, unlikely,* or *impossible* and explain why you chose each answer.

7 The card has a striped trapezoid. _____

_____

_____

_____

8 The card does not have a triangle. _____

_____

_____

_____

Give an example of a possibility that fits each label.

9 Impossible The card _____

10 Likely The card _____

11 Unlikely The card _____

12 **Challenge** Michaela has a bag of marbles. $\frac{1}{3}$ of the marbles are red, $\frac{1}{6}$ of the marbles are blue, and $\frac{1}{2}$ of the marbles are yellow.

If Michaela picks a marble without looking, what color is she most likely to pick? _____

Explain your reasoning.

_____

_____

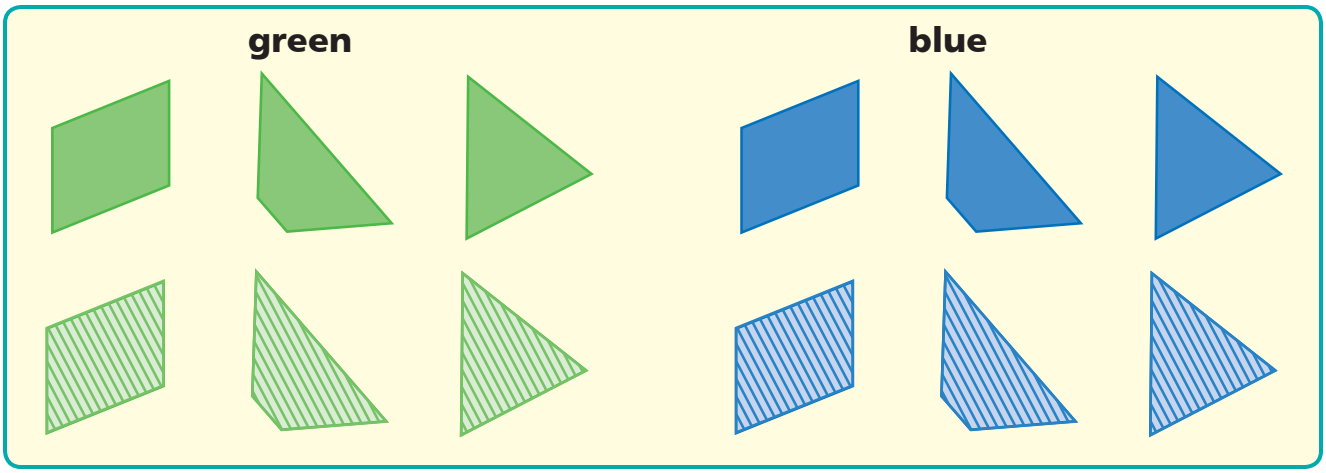
Chapter 10

Lesson 3

Name _____ Date _____

Introducing Probability

NCTM Standards 1, 2, 6, 7, 8, 9, 10



In the answer boxes on the right side of the page, write a fraction to show the probability of getting a card like the named card if you draw one card without looking.

What portion of the cards . . .

1	. . . have a solid green trapezoid?	____ out of ____	_____
	. . . do NOT have a solid green trapezoid?	____ out of ____	_____
2	. . . are red?	____ out of ____	_____
	. . . are NOT red?	____ out of ____	_____
3	. . . have a solid blue figure?	____ out of ____	_____
	. . . do NOT have a solid blue figure?	____ out of ____	_____
4	. . . have a trapezoid?	____ out of ____	_____
	. . . are blue?	____ out of ____	_____
	. . . have a blue trapezoid?	____ out of ____	_____
	. . . are a trapezoid or blue or both?	____ out of ____	_____

For each pair, circle the outcome that is more likely.
Circle both if they are equally likely.

5 The card has a parallelogram. The card does NOT have a parallelogram.

6 The card has a striped triangle. The card has a parallelogram.

7 The card has a parallelogram. The card has a solid blue figure.

8 The card has a striped trapezoid. The card has a striped triangle.

9 The card has a green figure. The card has a triangle.

10 Explain why you chose your answers for Problems 5–9.

11 The card has an orange figure. The card does NOT have a parallelogram.

12 Explain why you chose your answer for Problem 11.

13 **Challenge** Imagine that you choose one card from the deck, look at it, put it back, shuffle, and then repeat 30 times. About how many times do you expect to see a card with a blue figure on it? _____

Is it certain, likely, unlikely, or impossible that you will see at least one card more than once? _____

Chapter 10

Lesson 4

Name _____ Date _____

Drawing From a Deck of Attribute Cards

NCTM Standards 1, 2, 6, 7, 8, 9, 10

Trapezoid Experiment

Draw an attribute card from the deck 30 times, replacing the card and shuffling the deck after each draw. How many times did you pick a card with a trapezoid on it?

Data

For each draw, mark whether the card has a trapezoid or not by writing **YES** or **NO** in the column on the right.

Draw	Trapezoid?
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	

Draw	Trapezoid?
11	
12	
13	
14	
15	
16	
17	
18	
19	
20	

Draw	Trapezoid?
21	
22	
23	
24	
25	
26	
27	
28	
29	
30	

What portion of the cards you drew were trapezoids? _____ out of 30

In several classrooms, students drew a card 30 times and recorded the number of triangles they picked. The results for three of the classes are given below.

A

Number of triangles picked	5	6	7	8	9	10	11	12	13	14	15
Number of students	0	0	0	8	4	8	7	2	1	0	0

B

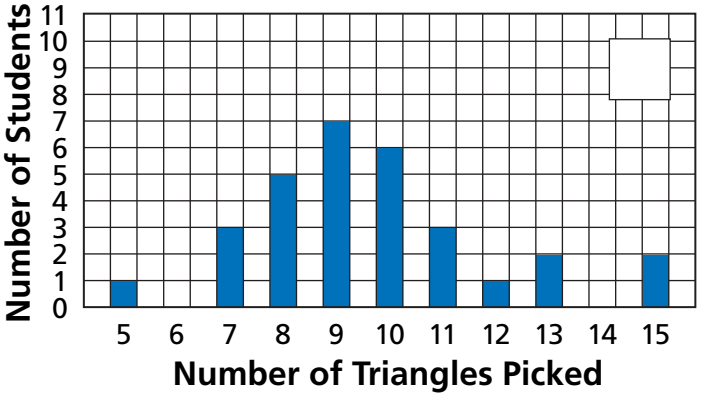
Number of triangles picked	5	6	7	8	9	10	11	12	13	14	15
Number of students	0	0	1	6	6	11	5	1	0	0	0

C

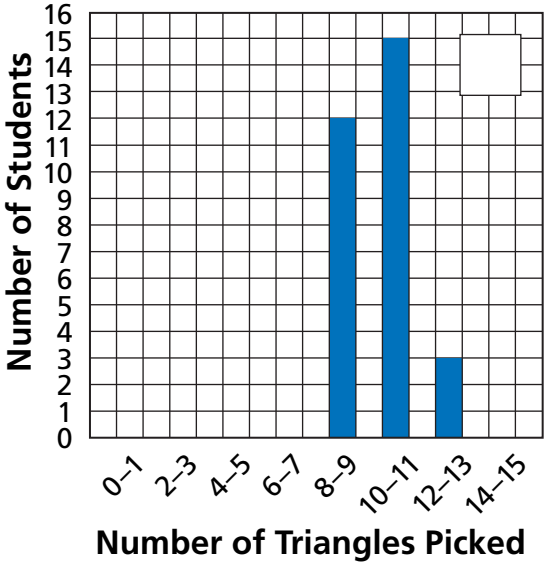
Number of triangles picked	5	6	7	8	9	10	11	12	13	14	15
Number of students	1	0	3	5	7	6	3	1	2	0	2

Label each graph with the set of data it matches.

1



2 Challenge



Chapter 10

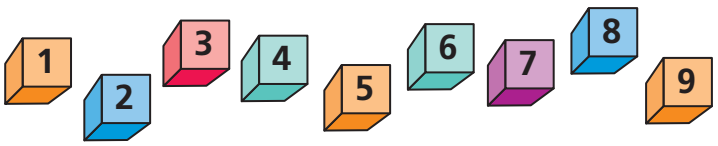
Lesson 5

Name _____ Date _____

Drawing Blocks

NCTM Standards 1, 2, 6, 7, 8, 9, 10

In the 9-block experiment, your class drew one of these blocks at random, 27 times. Use your class's graph of the data from the experiment to answer these questions.



1. Which block or blocks was picked most frequently? _____

2. Which block or blocks was picked least frequently? _____

3. What portion of the blocks picked were even-numbered? _____ out of _____

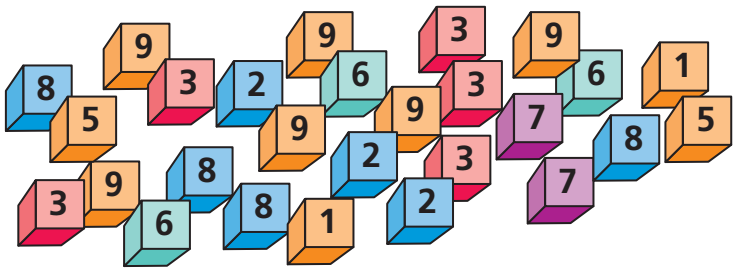
4. What portion of the blocks picked were numbered with multiples of 3? _____ out of _____

5. What portion of the blocks picked were numbered with square numbers? _____ out of _____

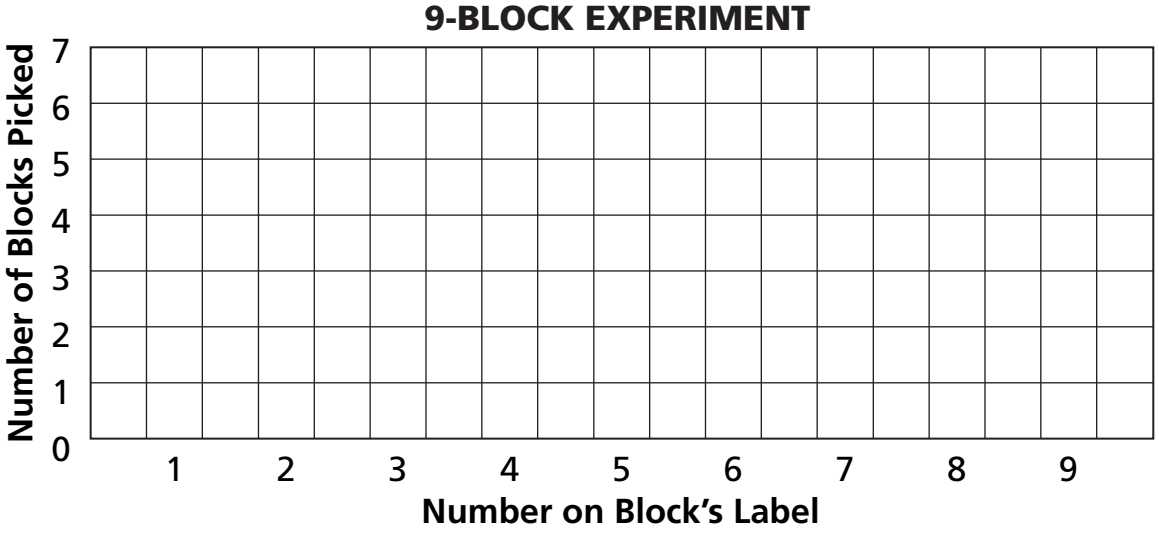
6. What portion of the blocks picked were numbered 5 or higher? _____ out of _____

7. Were there any blocks that didn't get picked at all? _____

Mrs. Garabedian's class did the 9-block experiment. Each student picked a block from the bag. Here are their results:



8 Graph the data.



9 What portion of the blocks picked were even-numbered? _____ out of _____

10 What portion of the blocks picked were numbered with multiples of 3? _____ out of _____

11 Challenge Choose one thing about this class's results that surprises you. Explain why it surprises you.

_____

_____

_____

Chapter 10

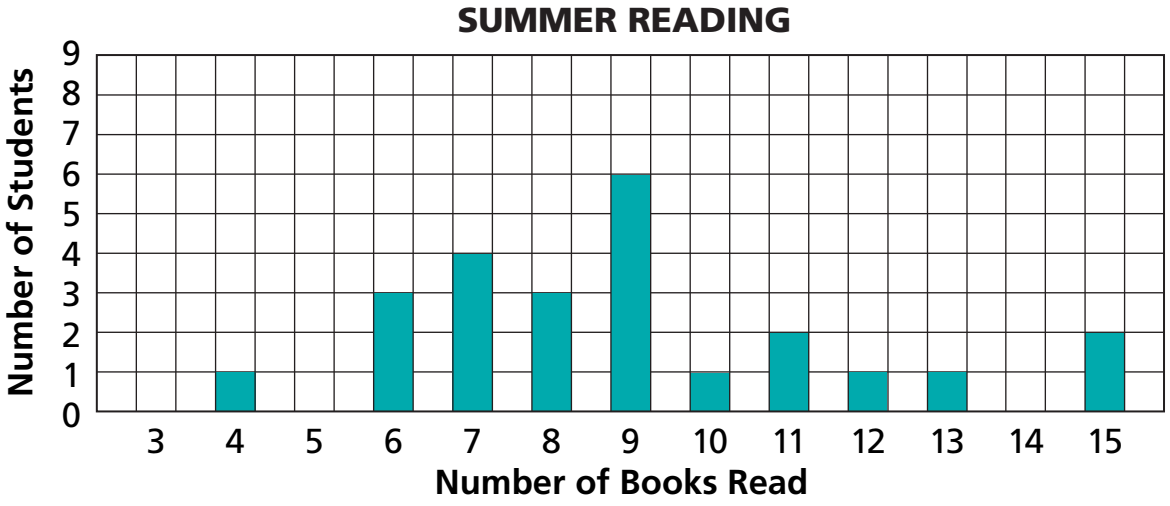
Lesson 6

Name _____ Date _____

Collecting and Analyzing Survey Data

NCTM Standards 1, 2, 6, 7, 8, 9, 10

Ms. Ramiro's class made a graph of the number of books each student read during summer vacation.



1. What was the most common number of books read? _____

2. What was the largest number of books read? _____

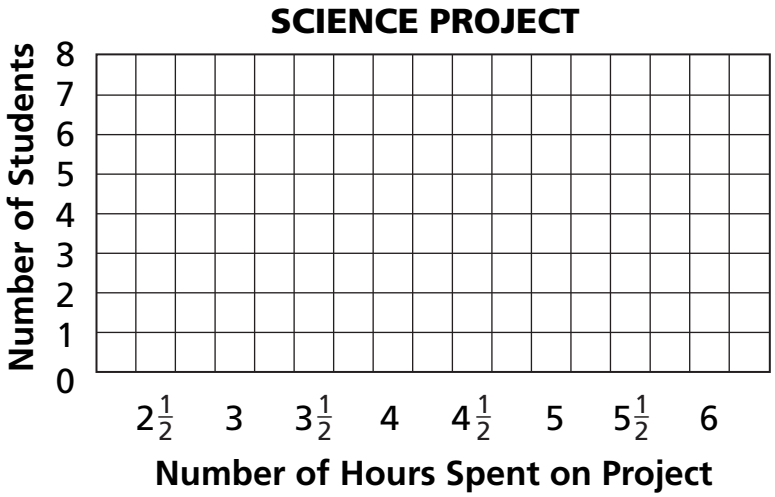
3. What portion of the students read at least 8 books? _____ out of _____

4. What portion of the students read 6, 7, 8, or 9 books? _____ out of _____

Mr. Tan surveyed his students to find out how long it took them to finish a science project. Here is the data:

3 hours	5 hours	$5\frac{1}{2}$ hours	4 hours	3 hours
5 hours	$4\frac{1}{2}$ hours	4 hours	$4\frac{1}{2}$ hours	$3\frac{1}{2}$ hours
$3\frac{1}{2}$ hours	4 hours	3 hours	$3\frac{1}{2}$ hours	3 hours
4 hours	$3\frac{1}{2}$ hours	6 hours	3 hours	5 hours

5 Graph the data.



6 About half the class spent at least _____ hours on the project.

7 The amount of time the most students spent was _____ hours.

8 **Challenge** The students who took at least 5 hours to finish their project included graphs. Mr. Tan now wants all of his students to include graphs in their next project. Predict how much extra time it will take the students to include graphs in their next project. Explain how you found your answer.

_____

_____

_____

_____

Chapter 10
Lesson 7

Name _____ Date _____

Collecting Measurement Data

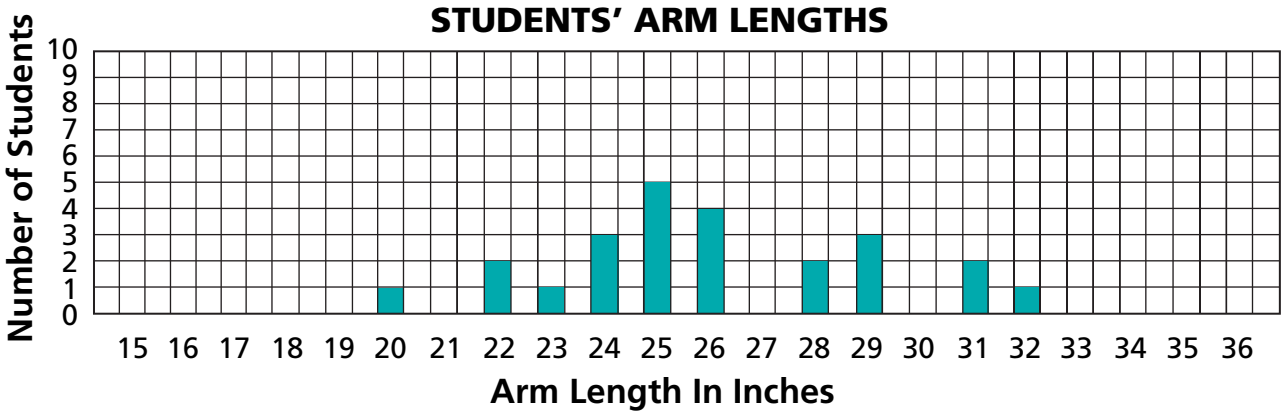
NCTM Standards 1, 2, 6, 7, 8, 9, 10

Collecting Data

Measure the length of your arm to the nearest quarter inch.

Measurement: _____ Round to the nearest inch: _____

Here are the arm lengths in a fourth-grade class.
Record your own arm length on the graph.



1. If you picked a student at random from this class, what is the likelihood that the student's arms would be at least 1 inch longer than yours? Circle your answer.

Certain Likely Unlikely Impossible

Explain your answer. _____

2. If you picked a student at random from this class, what is the likelihood that the student's arms would be at least 5 inches longer than yours? Circle your answer.

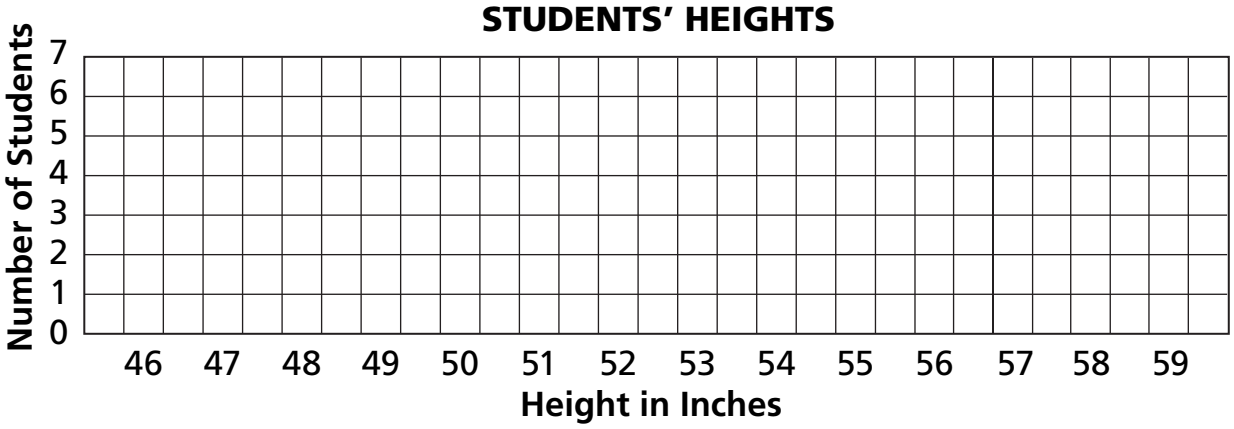
Certain Likely Unlikely Impossible

Explain your answer. _____

Height Measurements
A third grade class measured the height of each student.

50 inches	54 inches	52 inches	51 inches	51 inches
56 inches	58 inches	54 inches	54 inches	55 inches
51 inches	52 inches	53 inches	55 inches	52 inches
54 inches	51 inches	55 inches	52 inches	54 inches
50 inches				

3 Graph the data that the class collected.



4 What is the most common height in the class? _____

5 Challenge Shawn is a student in the class. Half the students are shorter than he is and half are taller. How tall is Shawn? _____

Chapter 10

Lesson 8

Name _____ Date _____

Analyzing Measurement Data

NCTM Standards 1, 2, 6, 7, 8, 9, 10

Now that your class has collected and graphed data about the lengths of students' arms, use the graph to answer these questions about the data.

1. What is the shortest arm length in your class? _____ inches

2. What is the longest arm length in your class? _____ inches

3. Which arm lengths showed up most frequently in your measurement data? _____ inches

4. What is the range of arm lengths in your class? _____ in. to _____ in.

5. How many students are in your class? _____ students

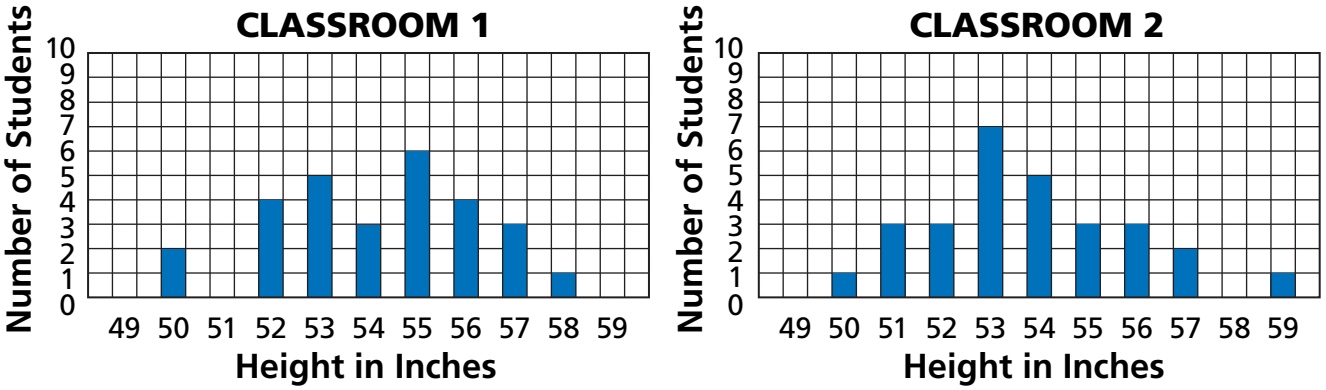
6. How many students have arms that are 20 inches long? _____ students

7. If you picked a student at random from your class, what is the probability that the student's arms would be exactly 20 inches long? _____

8. How many students have arms that are 40 inches long? _____ students

9. If you picked a student at random from your class, what is the probability that the student's arms would be 40 inches long? _____

Use these graphs to compare the data from two classrooms.



10 How many students are in each classroom? _____ students

11 How tall is the shortest student in each classroom?

Classroom 1 _____ Classroom 2 _____

12 In each classroom, half the students are as tall or taller than what height?

Classroom 1 _____ Classroom 2 _____

13 If you picked a student at random from each class, what is the probability that the student would be 53 inches tall?

Classroom 1 _____ Classroom 2 _____

14 **Challenge** You measure the height of a student in one of the classrooms. What can you be certain will be true about the measurement?

_____

_____

Chapter 10
Lesson 9

Name _____ Date _____

Problem Solving Strategy

Make a Graph

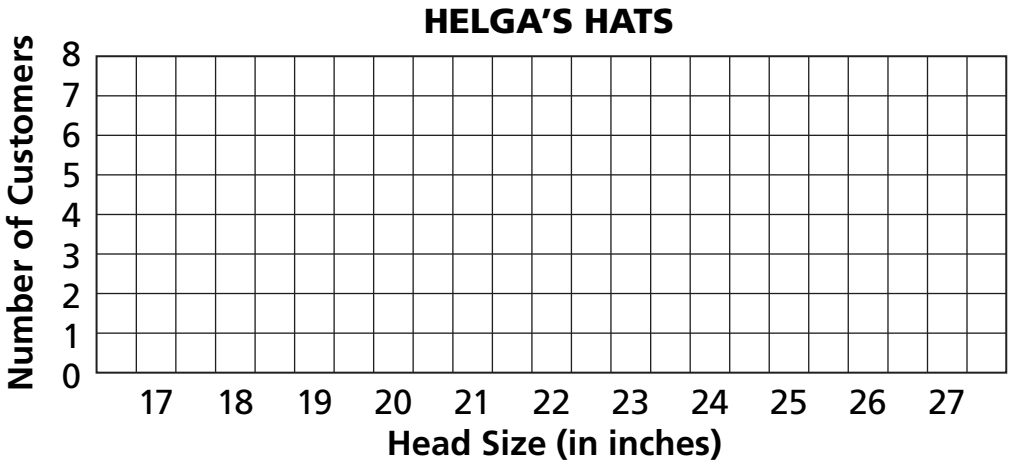
NCTM Standards 1, 2, 6, 7, 8, 9, 10

Understand
Plan
Solve
Check

Solve each problem. Helga's Hat Shop can afford to keep only 3 sizes of hats in stock. Helga measured the heads of 20 customers to get an idea of which sizes are most common.

1 Graph the data to find the 3 most common sizes.

18 inches	24 inches	22 inches	25 inches	19 inches
22 inches	20 inches	19 inches	20 inches	19 inches
21 inches	19 inches	21 inches	21 inches	20 inches
21 inches	20 inches	25 inches	21 inches	20 inches



2 The 3 most common head sizes are:

_____ inches

_____ inches

_____ inches

3 One of the 20 customers wants to buy a hat. What is the probability that one of the 3 sizes you chose will fit the customer?

_____

Problem Solving Test Prep

Choose the correct answer.

1 Samantha glues 8 cubes together to make a larger cube and paints the outside. When she takes the large cube apart, how many of the original 8 cubes will have exactly 3 faces painted?

A. 0 **C.** 4

B. 2 **D.** 8

2 In a board game, Tim begins at 0. He moves forward 3 spaces and back 1. If he makes that move a total of 12 times, how many spaces will he have advanced after the 12 moves?

A. 6 **C.** 9

B. 8 **D.** 24

Show What You Know

Solve each problem. Explain your answer.

3 Jenny brought 36 pieces of fruit to class. Of the 36 pieces of fruit, $\frac{1}{3}$ are oranges, $\frac{1}{3}$ are apples, and the rest are bananas. At the end of the school day, there are 5 bananas. How many bananas were eaten? Explain how you solved the problem.

4 Four girls compare their heights. Only one girl is shorter than Abby. Halley is shorter than Ellen. Jesse is shorter than Halley. From this information, can the girls be put in order from shortest to tallest? If so, explain your solution. If not, explain what other information you would need.

Chapter 10

Name _____ Date _____

Review/Assessment

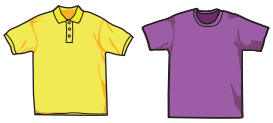
NCTM Standards 1, 2, 6, 7, 8, 9, 10

1 Nona has 2 pairs of pants, 2 shirts, and 2 pairs of shoes. Lesson 1

Pants

blue green

Shirts



yellow purple

Shoes

black red

How many different outfits can she wear? _____ outfits

List all the outfits here:

_____

_____

_____

_____

_____

There are 3 coins in a bag, a penny, a dime, and a nickel. You reach in and pull out one coin. Lesson 2

2 Label the events *certain, likely, unlikely,* or *impossible.*

You pull a coin that is worth **25¢**

_____

You pull a coin that is worth at least 5¢

_____

You pull a coin that is worth at least 1¢

_____

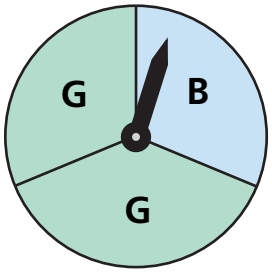
3 Circle the event that is more likely. If they are equally likely, circle them both.

You pull a coin that is worth 10¢.

You pull a coin that is worth less than 10¢.

You spin each spinner once. Write the probabilities that you'll land on green (G) or blue (B). Lessons 3, 4, and 5

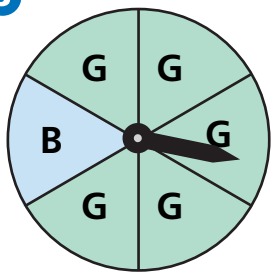
4



green sections =	_____ out of _____
blue sections =	_____ out of _____

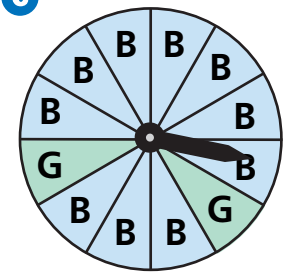
Probability of landing = on green	
Probability of landing = on blue	

5



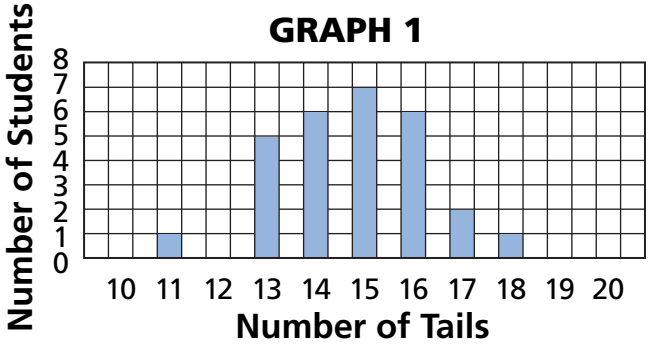
Probability of landing = on green	
Probability of landing = on blue	

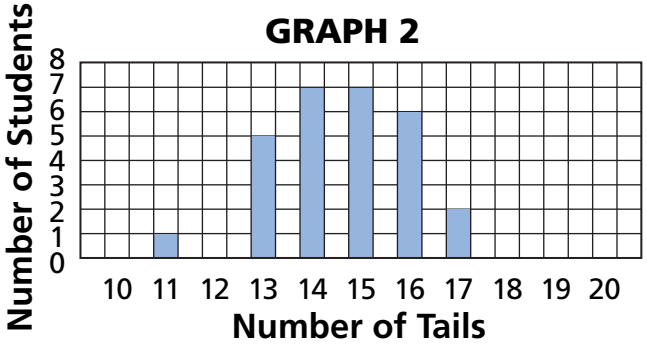
6



Probability of landing = on green	
Probability of landing = on blue	

7 Each student in a class of 28 students tossed a coin 30 times. Here are two graphs. One is NOT correct. Lessons 6, 7, 8, and 9





Here is a table of the original data.

Number of tails	10	11	12	13	14	15	16	17	18	19	20
Number of students	0	1	0	5	7	7	6	2	0	0	0

Which graph matches the data? _____