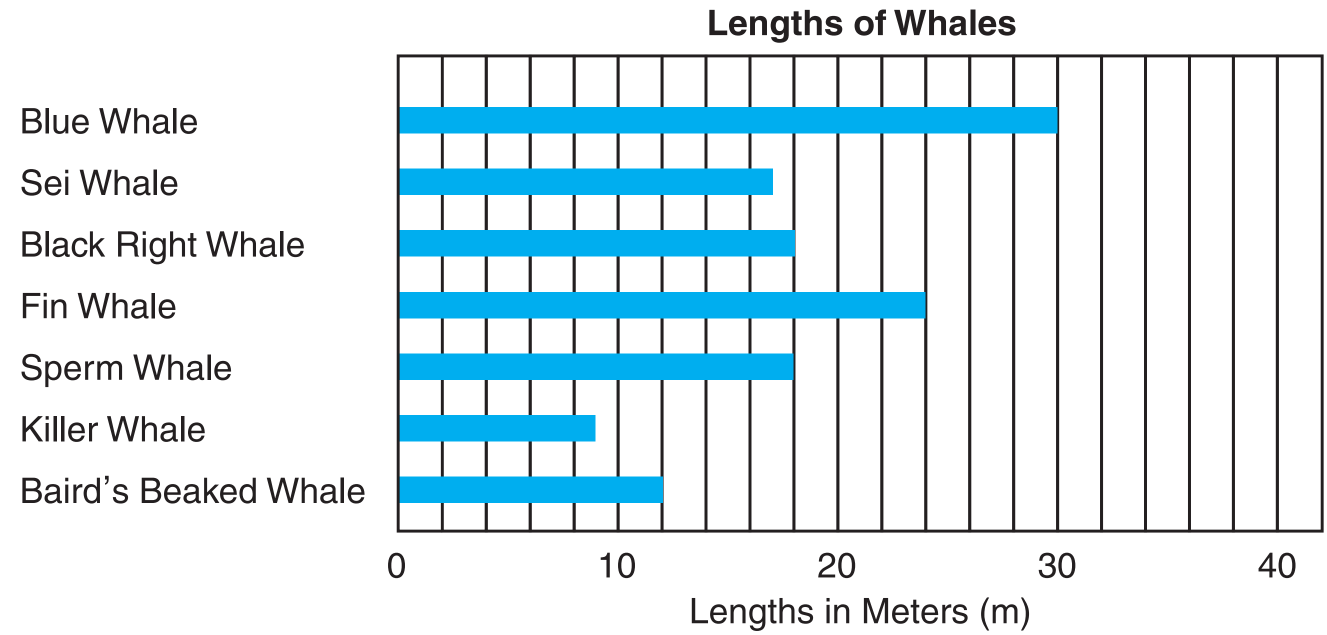
Bar graphs make it easy to compare information quickly.
To read a bar graph, find the bar that represents the information you want. Look from the edge of the bar in a straight line to the scale. Read the value from the scale.



Example: The blue whale is 30 meters long.

Use the bar graph to answer the questions.

1. What is the bar graph about? ______________________________

2. Which whale on the graph is the longest? ______________________

3. Which whale on the graph is the shortest? _____________________

4. Which whale is longer, the fin whale or the sperm whale? __________

5. What distance does each mark on the scale represent? ____________

6. What is the difference between the length of the Baird's beaked whale and the length of the killer whale? ____________

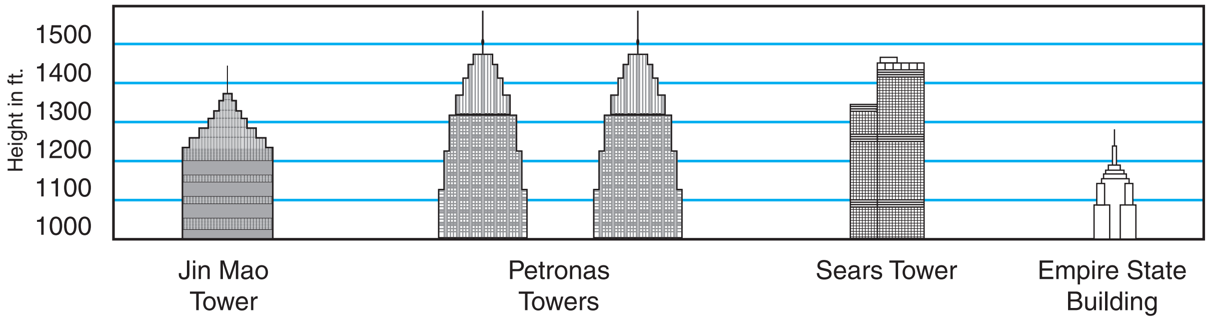
7. What is the difference between the length of the longest whale and the length of the shortest whale? ____________

Sometimes it's easier to get information from a graph. Other times it's easier to get the information from a table.

Height of Some of the Tallest Skyscrapers in the World

Building	Location	Height	Stories
Petronas Towers	Kuala Lumpur, Malaysia	1483 ft.	88
Sears Tower	Chicago, IL, USA	1450 ft.	110
Jin Mao Tower	Shanghai, China	1380 ft.	88
Empire State Building	New York, NY, USA	1250 ft.	102

Height of Some of the Tallest Skyscrapers in the World



Answer the questions. Check which was easier to use.

	Table	Graph	Either
1. How tall is the Jin Mao Tower? ______________________	☐	☐	☐
2. Which is taller, the Empire State Building or the Sears Tower? ______________________	☐	☐	☐
3. Where are the Petronas Towers located? ________________	☐	☐	☐
4. Which building is tallest? ______________________	☐	☐	☐
5. What is the difference between the heights of the tallest and shortest buildings? ________________	☐	☐	☐
6. How many buildings are taller than 1300 feet? ________________	☐	☐	☐

Evaluating use of graphs vs. tables

You can determine the **theoretical probability** of an event.
Here is a chart of all possible outcomes or ways the sum of two dice can come up.

	Sum		Sum		Sum		Sum		Sum		Sum
⚀ ⚀	2	⚁ ⚀	3	⚂ ⚀	4	⚃ ⚀	5	⚄ ⚀	6	⚅ ⚀	7
⚀ ⚁	3	⚁ ⚁	4	⚂ ⚁	5	⚃ ⚁	6	⚄ ⚁	7	⚅ ⚁	8
⚀ ⚂	4	⚁ ⚂	5	⚂ ⚂	6	⚃ ⚂	7	⚄ ⚂	8	⚅ ⚂	9
⚀ ⚃	5	⚁ ⚃	6	⚂ ⚃	7	⚃ ⚃	8	⚄ ⚃	9	⚅ ⚃	10
⚀ ⚄	6	⚁ ⚄	7	⚂ ⚄	8	⚃ ⚄	9	⚄ ⚄	10	⚅ ⚄	11
⚀ ⚅	7	⚁ ⚅	8	⚂ ⚅	9	⚃ ⚅	10	⚄ ⚅	11	⚅ ⚅	12

To find the probability that the sum of 6 will occur, you can use this formula:

$$P\ (\text{Event}) = \frac{\text{number of favorable outcomes}}{\text{number of possible outcomes}}$$

The probability of a sum of 6 coming up:

$$P\ (6) = \frac{\text{number of ways a sum of six can come up}}{\text{number of possible ways}} \longrightarrow \frac{5}{36} \longrightarrow$$

You can predict that a sum of 6 will come up 5 out of 36 times.

1. You can use the chart above to find the probability of a sum coming up on the dice. Complete each exercise.

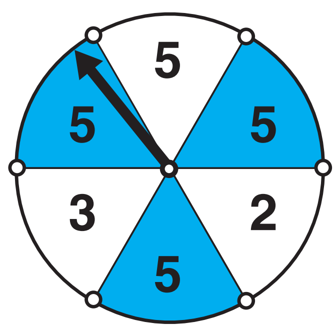
$P(2) = \frac{\quad}{36}$ $P(3) = \frac{\quad}{36}$ $P(4) = \frac{\quad}{36}$ $P(5) = \frac{\quad}{36}$ $P(7) = \frac{\quad}{36}$

$P(8) = \frac{\quad}{36}$ $P(9) = \frac{\quad}{36}$ $P(10) = \frac{\quad}{36}$ $P(11) = \frac{\quad}{36}$ $P(12) = \frac{\quad}{36}$

2. How do the answers above compare to the experimental probabilities you found on page 52? ______________________________

____

3. What is the theoretical probability that a head will come up when you toss a coin? P(H) = ________



4. What is the theoretical probability that this spinner will land on a 5? P(5) = ________

5. What is the theoretical probability of picking an M?

P(M) = ________ | M | A | T | H | E | M | A | T | I | C | S |

Using theoretical probability

Each possible arrangement or combination in a definite order is a **permutation.**

There are 5 dogs in a class at a dog show.

Lucky Dusty Muffin Buttons Sparky

Ribbons will be awarded for first, second, and third place. Here are the ten possible combinations of three “top dogs.” (Combinations are given using each dog’s initial.)

LDM LDB LDS LMB LMS LBS DMB DMS MBS BSD

Suppose Lucky, Buttons, and Sparky are the three “top dogs.” Because they are awarding 1st, 2nd, and 3rd places, the arrangement of the dogs in *order* is important. The six arrangements or permutations in 1st, 2nd, and 3rd place order of Lucky, Buttons, and Sparky are

Lucky first	Buttons first	Sparky first
↓	↓	↓
LBS LSB	BSL BLS	SBL SLB

Suppose prizes for 1st, 2nd, 3rd, and 4th place are awarded in the class at the dog show.

What are the five combinations of 4 “top dogs”?

__________ __________ __________ __________ __________

Suppose Lucky, Buttons, Muffin, and Sparky are the 4 “top dogs.” Complete the table to show the possible permutations or arrangements of dogs in 1st, 2nd, 3rd, and 4th places. (A few examples are provided.)

Lucky finishes 1st	**Buttons finishes 1st**	**Muffin finishes 1st**	**Sparky finishes 1st**
L B M S	B ___ ___ ___	M ___ ___ ___	S ___ ___ ___
L B S M	B ___ ___ ___	M ___ ___ ___	S ___ ___ ___
L M B S	B ___ ___ ___	M ___ ___ ___	S ___ ___ ___
L M S B	B ___ ___ ___	M ___ ___ ___	S ___ ___ ___
L S B ___	B ___ ___ ___	M ___ ___ ___	S ___ ___ ___
L S M ___	B ___ ___ ___	M ___ ___ ___	S ___ ___ ___

How many permutations are there? ________

Determining permutations