

3.G.1 What is a Graph?

Creation and interpretation of various graph types

| | |
|------------------------------|---|
| Grade Level | 3 |
| Sessions | (1): 50 minutes |
| Seasonality | None |
| Instructional Mode(s) | Whole Class |
| Team Size | N/A |
| WPS Benchmarks | 03.SC.TE.04 |
| MA Frameworks | 3-5.TE.2.2 |
| Key Words | Bar Graph, Graph, Line graph, Pie Graph |

Summary

This lesson introduces students to bar graphs, line graphs, and pie graphs. It also provides the students with an opportunity to interpret information and to create graphs from given data.

Learning Objectives

2002 Worcester Public Schools (WPS) Benchmarks for Grade 3

1. 03.SC.TE.04 Describe different ways in which a problem can be represented, e.g., sketches, diagrams, graphic organizers, and lists.

2001 Massachusetts Frameworks for Grade 3

1. 3-5.TE.2.2 Describe different ways in which a problem can be represented, e.g., sketches, diagrams, graphic organizers, and lists.

Additional Learning Objectives

1. Students will understand the differences between several types of graphs.
2. Students will learn how to read several different types of graphs.
3. Students will become familiar with how to create a graph from given data.
4. Students will understand when to use the appropriate graphs.

Required Background Knowledge

None

Essential Questions

1. How are graphs read?

2. How are graphs created?
3. What is a pie graph?
4. What is a bar graph?
5. What is a line graph?
6. What are the differences between the graphs?
7. What are the similarities between the graphs?
8. For what purposes are graphs used?

Introduction / Motivation

The instructor might begin the lesson by asking students how many are right-handed and how many are left-handed. (S)he might then create a free-hand bar graph in a visible location, as a demonstration.

Procedure

The instructor will:

Part 1: (50 minutes)

1. Explain to the students the different parts of a graph (see Appendix A: Instructor's Notes).
2. Explain the various types of graphs (pie, line, bar) to the students (see Vocabulary with Definitions).
3. Explain the differences and similarities between the graphs (see Appendix A: Instructor's Notes).
4. Lead the students through the first part of the What is a Graph? worksheet.
5. List the following categories in a visible location: science, math, writing, social studies, spelling and "other".
6. Ask students which subject is their favorite and record numbers of students on the board.
7. Ask students to record these numbers in the second section of the What is a Graph? worksheet.
8. Ask students to create a bar graph with the data.

Materials List

| Materials per student | Amount | Location |
|------------------------------|---------------|---|
| <u>What is a Graph?</u> | One | End of lesson plan – print or photocopy |

Vocabulary with Definitions

1. *Bar Graph* – a chart with bars whose lengths represent amounts of various items.
2. *Graph* – a pictorial device used to represent quantitative (numerical) relationships.
3. *Line Graph* – a diagram of lines made by connected data points.
4. *Pie Graph* – a circular graph that is divided by lines, like a pie, to depict the proportions of the various measured objects.

Assessment / Evaluation of Students

The instructor may assess the students in any/all of the following manners:

1. Collect student worksheets to determine if students understand how to read graphs and the differences among various types of graphs.

Lesson Extensions

1. Add graphing into existing lesson plans.

Attachments

1. Appendix A : Instructor's Notes
2. What is a Graph?

Troubleshooting Tips

None

Safety Issues

None

Additional Resources

None

Appendix A: Instructor's Notes

Parts of a graph:

- Title: each graph should have a simple title.
- X-axis: horizontal axis, which should be labeled.
- Y-axis: vertical axis, which should be labeled.
- Each axis is numbered with equal intervals.

Similarities and differences between graphs:

| Pie Graph | Line Graph | Bar Graph |
|---------------------------------------|---|---------------------------------------|
| Circular | X-Y axis | X-Y axis |
| Makes comparisons within one category | Compares two different categories | Makes comparisons within one category |
| Usually represented by percentages | Usually represented by whole numbers or fractions | Usually represented by whole numbers |

What is a Graph?

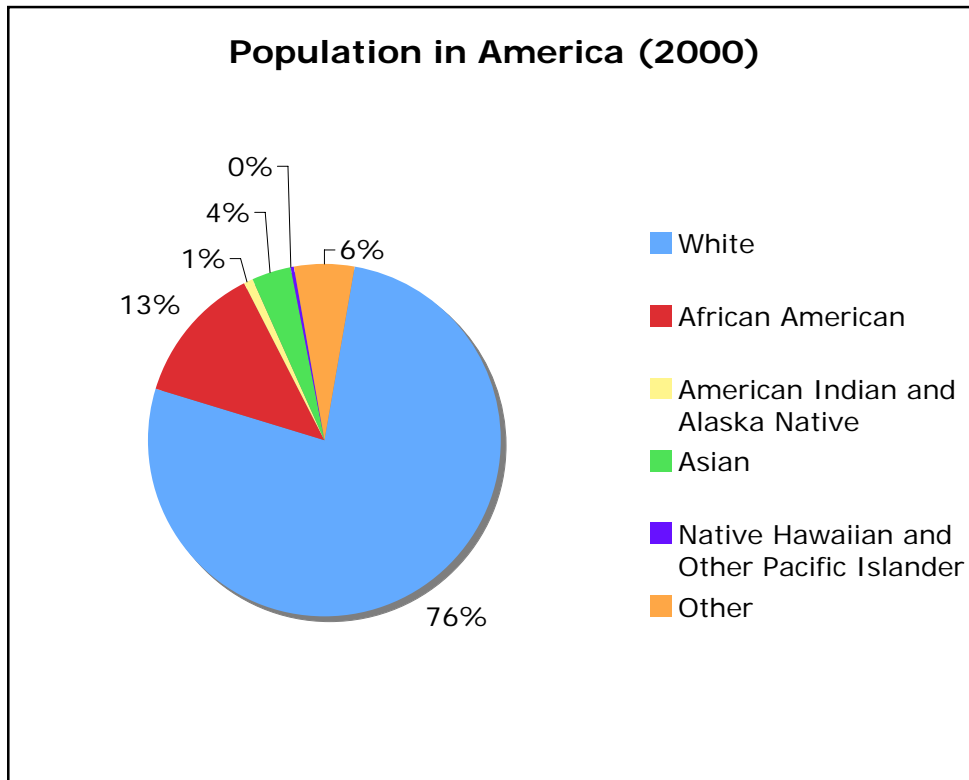
Name: _____

Date: _____

Part 1:

Directions: Using the graphs, answer the questions.

1. The following graph is a pie graph:

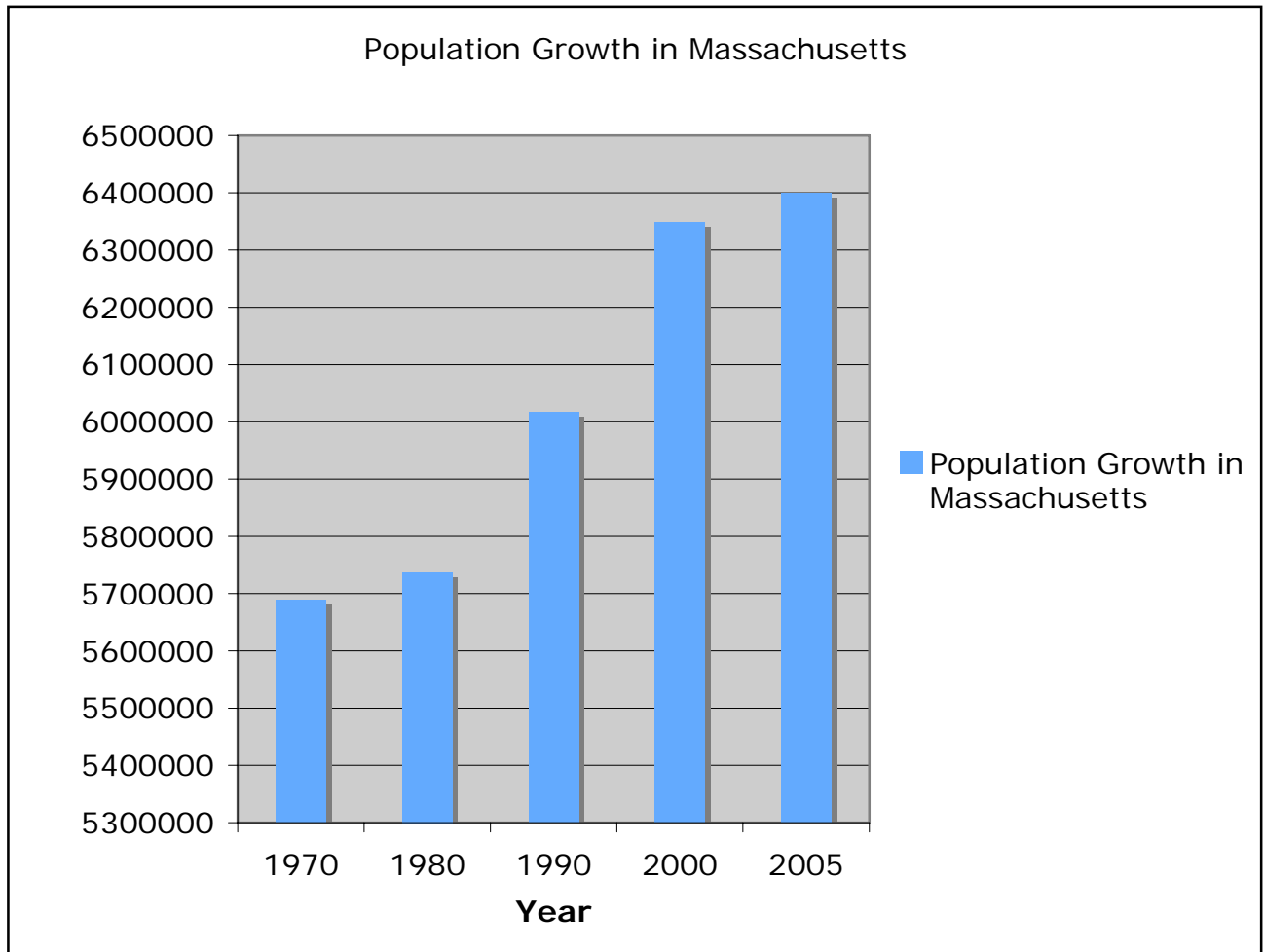


What percentage of the American population is white?

What percentage of the American population is African American?

What percentage of the American population is Asian?

2. The following graph is a bar graph:



In what year was the population least in Massachusetts?

In what year was the population greatest in Massachusetts?

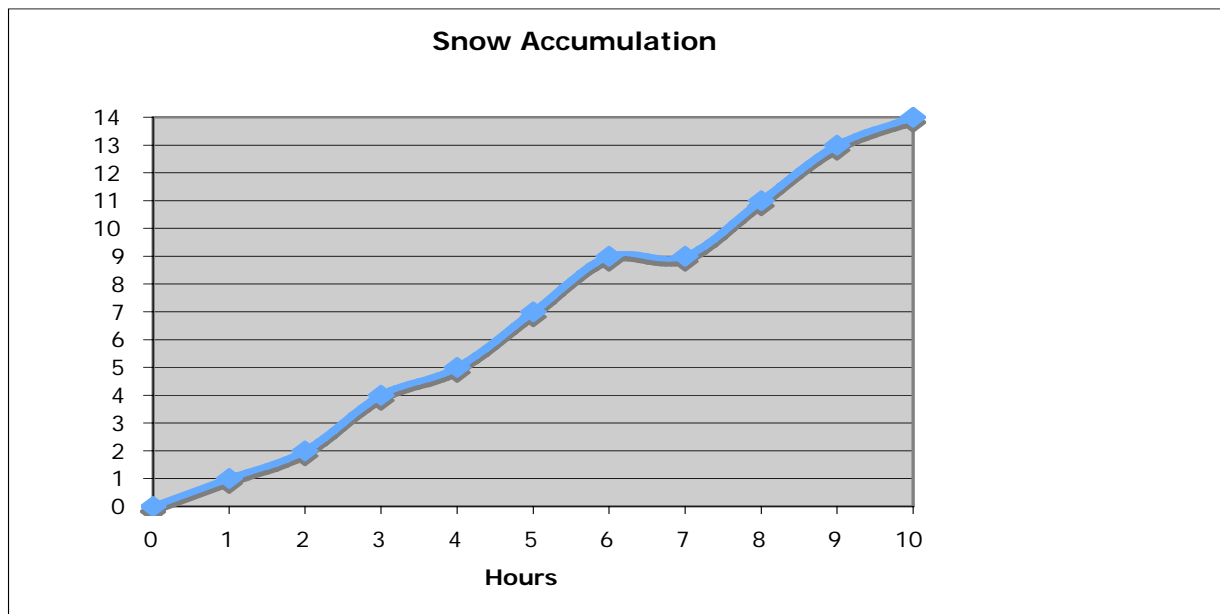
What was the population in 1980?

Challenge Question

About how much did the population increase from the year 1990 to the year 2000?

3. It snowed in Massachusetts for 10 hours and the accumulation was 14 centimeters. The following is a chart and line graph of the snow pattern for the 10 hours.

| Number of Hours | Amount of snow in centimeters |
|-----------------|-------------------------------|
| 0 | 0 |
| 1 | 1 |
| 2 | 2 |
| 3 | 4 |
| 4 | 5 |
| 5 | 7 |
| 6 | 9 |
| 7 | 9 |
| 8 | 11 |
| 9 | 13 |
| 10 | 14 |



After 3 hours, how much snow was on the ground? _____ Centimeters

How many hours did it take for 7 inches of snow to accumulate? _____ Hours

Part 2:

Record the favorite school subject of all students in your class and create a bar graph using the collected data. On the next page, label each of the lines on the left-hand side of your graph. The first two numbers have been done for you. Create a bar graph using the data that your class collects.

| Subject | Number of Students |
|----------------|---------------------------|
| Science | |
| Math | |
| Social Studies | |
| Writing | |
| Spelling | |
| Other | |

Students' Favorite Subjects

