# Power of the Pyramids

## Student Activity

## Method:

Students construct and interpret population pyramids and discuss differences in population growth rates among several different countries.

## Introduction:

To help them make population projections for different countries, **demographers** (who study population) look at the profile of the countries' residents. What are the ages of the people? How many are men? How many are women? Taking this information, they construct **population pyramids** like the ones students will create in this activity. These graphs depict the configuration of a country's population as impacted by 70 to 80 years of economic, political, and natural events. These graphs can also help predict future population trends.

## Procedure:

1. Display the world population pyramid and explain that this is a kind of graph used by demographers to study the distribution of people across age and gender categories.

2. Explain to the students that the graph represents the entire world population sorted by age and gender, with the youngest at the bottom and the oldest at the top. Each age level grouping is called a **cohort**.

3. Assign each student or group of students one of the six countries, and distribute graph paper and a copy of the student worksheet for that country.



| AGE | MALE | WORLD | FEMALE |
|-----|------|-------|--------|
| 75 + | | | |
| 70-74 | | | |
| 65-69 | | | |
| 60-64 | | | |
| 55-59 | | | |
| 50-54 | | | |
| 45-49 | | | |
| 40-44 | | | |
| 35-39 | | | |
| 30-34 | | | |
| 25-29 | | | |
| 20-24 | | | |
| 15-19 | | | |
| 10-14 | | | |
| 5-9 | | | |
| 0-4 | | | |

9 8 7 6 5 4 3 2 1 0 1 2 3 4 5 6 7 8 9
Percentage of Population

4. The figures on the worksheet represent the population (in thousands) of each age group within each gender for each particular country. In order to construct the country's pyramid, students must first calculate the percentage of the population of each gender in each age group.

Example: According to the worksheet, the United States' total population in 2007 was 301,139,947. The population of males ages 0-4 was 10,635,491.
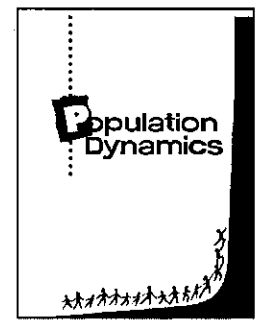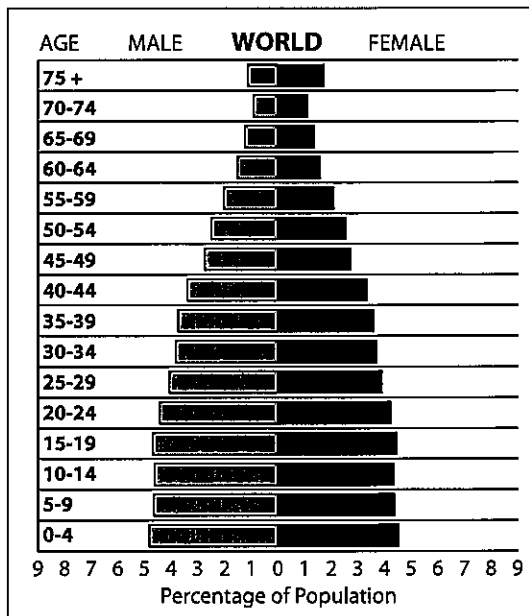
$$\frac{10,635,000}{301,140,000} = .035 \text{ or } 3.5\%$$

Students should complete these calculations for each cohort.

4. Using graph paper, students can construct a population pyramid as in the example. A line drawn down the middle of the graph separates the male and female populations. The percentages of the population will be plotted along the X-axis with females to the right of the center line, males to the left. The age groups will be running up the Y-axis with the youngest at the bottom, oldest at the top. (See "World Population Pyramid" for an example.)

5. Have students graph the percentage data for their assigned country.

6. Have students hold up their finished graphs for all to see while going through the follow-up questions in class.

## Concept:

The age and gender distribution of a regional or national population affects its growth rate and provides information on its past, present, and future growth patterns.

## Objectives:

Students will be able to:
• Calculate percentages using raw numbers for each age/gender group in a given population.
• Construct a population age/gender distribution graph for one of six different countries.
• Make correlations between the shapes of the graphs and the growth patterns of different countries.

## Subjects:

Mathematics, biology, social studies, environmental science

## Skills:
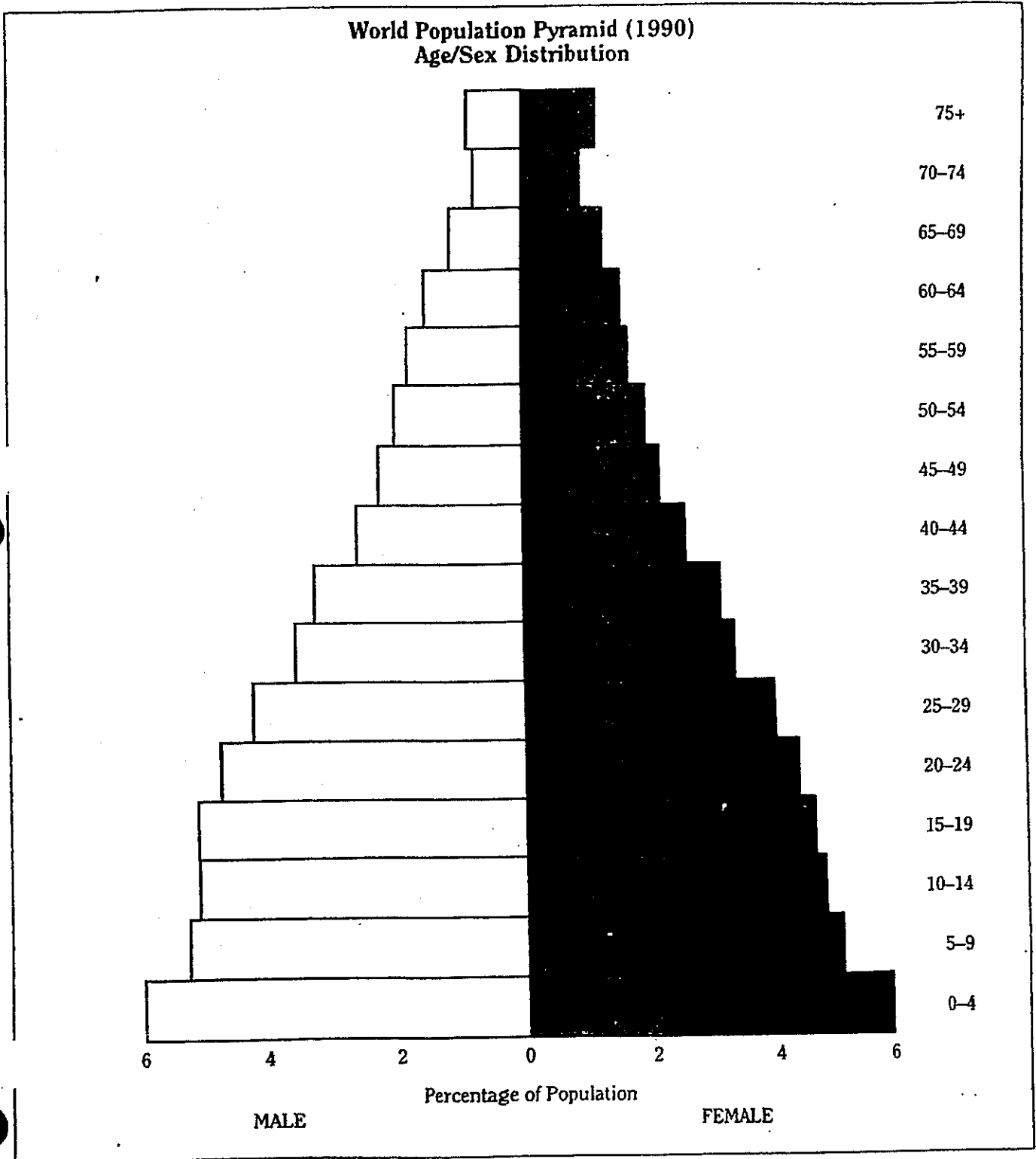
Calculating, graphing, analyzing and interpreting data

## Materials:

Copies of student worksheet
Power of the Pyramids graph paper
Colored pencils
Rulers
Calculators

## Key Terms: cohort, demographers, population pyramid

# Power of the Pyramids

### World Population Pyramid (1990)
### Age/Sex Distribution

| | |
|---|---|
| | 75+ |
| | 70–74 |
| | 65–69 |
| | 60–64 |
| | 55–59 |
| | 50–54 |
| | 45–49 |
| | 40–44 |
| | 35–39 |
| | 30–34 |
| | 25–29 |
| | 20–24 |
| | 15–19 |
| | 10–14 |
| | 5–9 |
| | 0–4 |

```
6      4      2      0      2      4      6
```

Percentage of Population

MALE                                    FEMALE

# Power of the Pyramids

Student Worksheet 1

**Population in Thousands (2007)**

| Age Group | United States M | % | F | % | Mexico M | % | F | % | China M | % | F | % |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0-4 | 10,635 | | 10,181 | | 5,532 | | 5,293 | | 44,095 | | 39,021 | |
| 5-9 | 10,156 | | 9,717 | | 5,553 | | 5,324 | | 46,723 | | 40,692 | |
| 10-14 | 10,360 | | 9,880 | | 5,612 | | 5,394 | | 52,708 | | 46,894 | |
| 15-19 | 11,115 | | 10,551 | | 5,419 | | 5,293 | | 62,136 | | 56,703 | |
| 20-24 | 10,794 | | 10,241 | | 4,857 | | 4,945 | | 55,406 | | 52,237 | |
| 25-29 | 10,570 | | 10,242 | | 4,393 | | 4,652 | | 50,075 | | 47,347 | |
| 30-34 | 9,786 | | 9,596 | | 4,252 | | 4,468 | | 53,965 | | 51,894 | |
| 35-39 | 10,558 | | 10,491 | | 3,770 | | 4,077 | | 64,679 | | 61,198 | |
| 40-44 | 10,878 | | 11,003 | | 3,148 | | 3,574 | | 62,035 | | 59,138 | |
| 45-49 | 11,280 | | 11,567 | | 2,692 | | 3,088 | | 37,202 | | 35,083 | |
| 50-54 | 10,272 | | 10,721 | | 2,426 | | 2,426 | | 43,977 | | 42,011 | |
| 55-59 | 8,855 | | 9,424 | | 1,872 | | 1,872 | | 33,974 | | 32,403 | |
| 60-64 | 6,889 | | 7,531 | | 1,532 | | 1,532 | | 22,630 | | 22,581 | |
| 65-69 | 5,027 | | 5,758 | | 1,219 | | 1,219 | | 18,972 | | 18,413 | |
| 70-74 | 3,857 | | 4,727 | | 770 | | 914 | | 15,022 | | 15,695 | |
| 75+ | 6,975 | | 11,506 | | 1,392 | | 1,392 | | 15,690 | | 20,249 | |
| Total | 148,007 | | 153,136 | | 54,439 | | 55,463 | | 679,289 | | 641,559 | |
| Total | 301,143 | | | | 109,902 | | | | 1,320,848 | | | |

# Power of the Pyramids

## Student Worksheet 2

### Population in Thousands (2007)

| Age Group | India M | India % | India F | India % | Nigeria M | Nigeria % | Nigeria F | Nigeria % | France M | France % | France F | France % |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0-4 | 64,688 | | 58,527 | | 11,216 | | 11,055 | | 2,069 | | 1,972 | |
| 5-9 | 63,127 | | 57,522 | | 9,325 | | 9,191 | | 2,032 | | 1,934 | |
| 10-14 | 60,393 | | 55,307 | | 8,185 | | 8,056 | | 1,963 | | 1,870 | |
| 15-19 | 55,876 | | 51,428 | | 7,200 | | 7,077 | | 2,047 | | 1,955 | |
| 20-24 | 52,609 | | 48,813 | | 6,342 | | 6,213 | | 2,054 | | 1,972 | |
| 25-29 | 48,940 | | 45,973 | | 5,598 | | 5,412 | | 2,097 | | 2,021 | |
| 30-34 | 45,242 | | 42,945 | | 4,506 | | 4,212 | | 2,153 | | 2,083 | |
| 35-39 | 40,707 | | 38,845 | | 3,616 | | 3,334 | | 2,316 | | 2,282 | |
| 40-44 | 34,734 | | 33,003 | | 2,957 | | 2,798 | | 2,242 | | 2,272 | |
| 45-49 | 29,309 | | 27,769 | | 2,422 | | 2,320 | | 2,160 | | 2,221 | |
| 50-54 | 24,298 | | 23,054 | | 1,986 | | 1,926 | | 2,083 | | 2,164 | |
| 55-59 | 19,686 | | 18,866 | | 1,624 | | 1,650 | | 2,078 | | 2,149 | |
| 60-64 | 15,577 | | 15,338 | | 1,292 | | 1,336 | | 1,570 | | 1,645 | |
| 65-69 | 11,653 | | 11,955 | | 916 | | 974 | | 1,197 | | 1,325 | |
| 70-74 | 7,942 | | 8,605 | | 583 | | 648 | | 1,116 | | 1,369 | |
| 75+ | 7,663 | | 9,471 | | 488 | | 573 | | 1,963 | | 3,344 | |
| Total | 582,444 | | 547,421 | | 68,256 | | 66,775 | | 31,140 | | 32,578 | |
| Total | 1,129,865 | | | | 135,031 | | | | 63,718 | | | |

Source: U.S. Census Bureau, International Database, www.census.gov

# Power of the Pyramids

**Discussion Questions Directions:** Answer the following questions based on your 6 completed pyramids, on a separate sheet of paper.

1. Where are you represented on the tables and on the graphs?

2. Can you tell from the data if there are more males or female babies in each country?

3. Are there more elderly women or men?  Why might that be the case?

4. Can you tell from the graphs which country has the most people?

5. Which country has the most people?  How can you tell?

6. Of the six graphs, which two look most like pyramids?  What does that indicate about their population growth rates?  What factors would change the shape of the pyramids in the future?

7. Looking at the pyramids, which country appears to have the slowest rate of population growth?  How can you tell?

8. Which are the largest age groups in the U.S.?

9. In which country do children make up the largest percentage of the population?

10. Some cultures have traditionally favored boy children over girl children (as can be seen in the pyramids for India and China).  Why might couples prefer to have boys rather than girls in these countries?  What are some consequences that may arise if a generation has a gender imbalance?