

<b>POPULATION PYRAMIDS</b>				<b>Student/Class Goal</b> Students ask questions about why jobs are leaving the United States. Looking at population pyramids will help them understand trends in the world economy which may impact their jobs.	
<b>Outcome</b> <i>(lesson objective)</i> Students will use population pyramids to answer questions, make comparisons, draw conclusions, and support predictions about the populations of China, India, and the United States.				<b>Time Frame</b> 60 minutes	
<b>Standard</b> <i>Use Math to Solve Problems and Communicate</i>				<b>NRS EFL 2-5</b>	
<b>Number Sense</b>	<b>Benchmarks</b>	<b>Geometry &amp; Measurement</b>	<b>Benchmarks</b>	<b>Processes</b>	<b>Benchmarks</b>
Words to numbers connection	2.1, 3.1, 4.1	Geometric figures		Word problems	
Calculation	2.2, 3.2, 4.2, 5.1	Coordinate system		Problem solving strategies	
Order of operations		Perimeter/area/volume formulas		Solutions analysis	4.27, 5.27
Compare/order numbers	2.3, 3.3	Graphing two-dimensional figures		Calculator	2.19, 3.22, 4.28, 5.28
Estimation	1.4, 2.4, 3.4, 4.5	Measurement relationships		Mathematical terminology/symbols	1.17, 2.20
Exponents/radical expressions		Pythagorean theorem		Logical progression	
<b>Algebra &amp; Patterns</b>	<b>Benchmarks</b>	Measurement applications		Contextual situations	
Patterns/sequences		Measurement conversions		Mathematical material	
Equations/expressions		Rounding		Logical terms	
Linear/nonlinear representations		<b>Data Analysis &amp; Probability</b>	<b>Benchmarks</b>	Accuracy/precision	3.26, 4.33, 5.34
Graphing		Data interpretation	2.15, 3.16, 4.20, 5.20	Real-life applications	2.22, 3.27, 4.34, 5.35,
Linear equations		Data displays construction	2.16, 3.17, 4.21, 5.21	Independence/range/fluency	2.23, 3.28, 4.35, 5.36
Quadratic equations		Central tendency			
		Probabilities			
		Contextual probability			
<b>Materials</b> China, India, United States Population Pyramids <i>Population Pyramids</i> Handout Casio fx-260 calculators					
<b>Learner Prior Knowledge</b> Students will need to be able to read bar graphs to obtain data to answer questions and make comparisons; write and add large numbers; and perform estimation and rounding. They should be familiar with vocabulary such as population and pyramid.					
<b>Instructional Activities</b> Step 1 - Ask students to use what they know about the words <i>population</i> and <i>pyramid</i> to determine what a population pyramid is and why it is useful. A population pyramid represents the age and sex structure of a population using bar graphs to represent the percentage or number of people in each age-sex group. In contrast to a typical bar graph, the graphs are on their sides with the axis in the middle. This means that they often take the shape of "pyramids" as the size of the population in the upper ages is smaller than that in the lower ages. This graph allows one to compare the relative size of age and sex groups at a glance.  Step 2 - Explain that for this activity we are going to look at the population pyramids of the three most populated countries in the world. Ask students what countries in the world have the largest populations. (China, India, United States) Have students locate the countries on a world map. Why might we want to compare the population pyramids of these three countries? (future population growth, impact on the world economy, job relocation, demand for natural resources) Pass out the population pyramids for China,					

India, and United States.

Explain that the USA census is conducted every 10 years. This lesson uses 2000 data, but more recent data can be found at [International Data Base](#).

**TEACHER NOTE** You might choose to use the 2000 data or you might prefer to choose the 2010 data for the three most populated countries of today.

Step 3 – Would a population pyramid be a good source of information if you needed to determine the total population of China in 2000? Why or why not? Explain that population pyramids are useful to understand the populations of different countries because they graphically show aspects of the population such as gender and age. Why are age and gender important characteristics of a country's population? They can reveal trends in population growth, family size, workforce size, the aging of the population, and the demand on different resources. They may help predict consumer patterns, health care needs, housing needs, and job opportunities.

Step 4 - Find the X axis on the population pyramid of China. What does the X axis represent? What does the Y axis represent? The left side of the pyramid? The right side of the pyramid?

Explain to students that estimating and rounding are important math concepts needed to understand the population pyramids. Can they determine exact population counts from the graphs?

Step 5 - Ask some questions about the China graph to model the types of questions students will answer on the worksheet. How many males ages 0-4 were there in China in 2000? Review place value as needed to write 50 million and 50,000,000. How many females ages 0-4 were there in China in 2000? Were there more males or females ages 0-4? How many more? How many total children ages 0-4 were in China in 2000? Refer to the math standard so students see how they are using the standard to answer your questions about the graphs. Show students how they can communicate the results in different ways using words or numbers and mathematical symbols such as > or <.

Step 6 - Find the X axis on the second graph (India). What does it represent? Compare the population pyramid of India to the pyramid of China. Why is the scale different? Compare the first two graphs to the graph of the USA. Why aren't the graphs drawn on the same scale? Remind students to pay close attention to the different scales when answering the questions about the population pyramids. Which graph shows the greatest population growth? Why can it be beneficial to compare population pyramids of different countries?

Step 7 - Pass out the *Population Pyramids* handout and have students answer the questions individually or in small groups. You may want to prompt students to consider consumer patterns, education needs, health care needs, job opportunities, and/or housing needs when determining how the population will affect the different countries over the next twenty years. You could put topics on the board and have students choose two or three to respond to.

Step 8 - Discuss the questions on the worksheet with the class. Compare answers. Discuss any other observations students made about the population pyramids.

**Assessment/Evidence** *(based on outcome)*

Teacher observation during class discussion  
Completed *Population Pyramids* Handout

**Teacher Reflection/Lesson Evaluation**

*Not yet completed.*

**Next Steps**

Students can make a population pyramid with real data from their state or community using [Population Pyramids and Demographic Summary Indicators for States](#). They can use the census bureau website to obtain population pyramids from other countries such as Mexico to compare to the USA.

**Technology Integration**

International Data Base <http://www.census.gov/population/international/data/idb/informationGateway.php>  
Select country and year, then submit, select tab for population pyramid.

Population Pyramids and Demographic Summary Indicators for States

<http://www.census.gov/population/www/projections/statepyramid.html>

**Purposeful/Transparent**

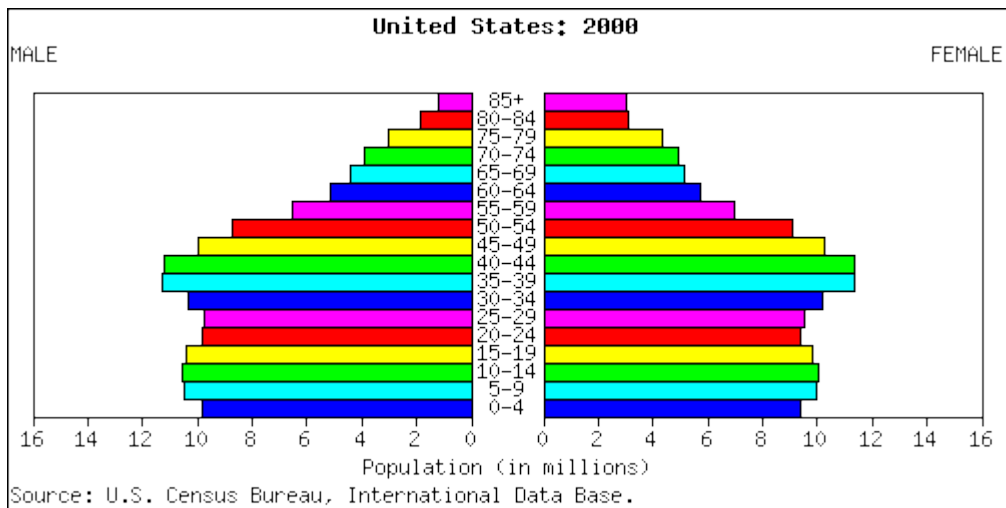
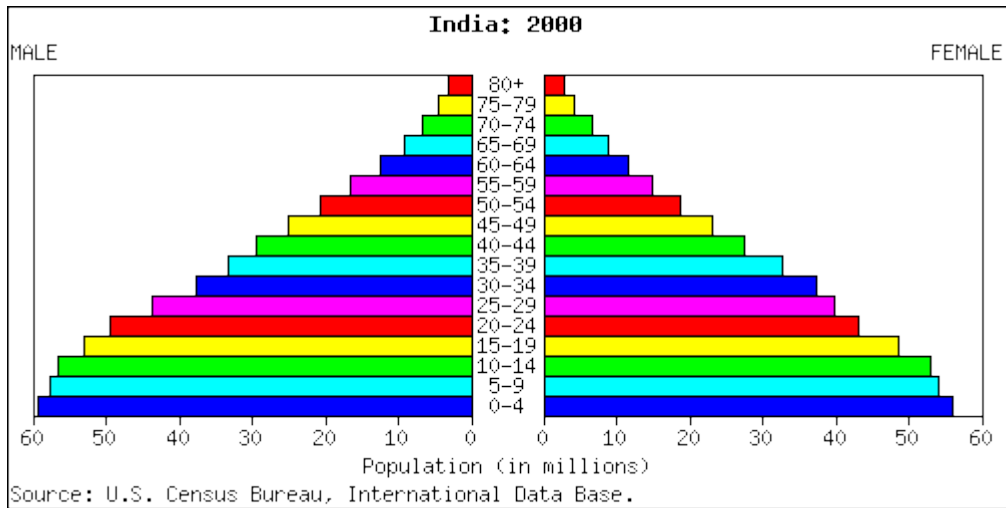
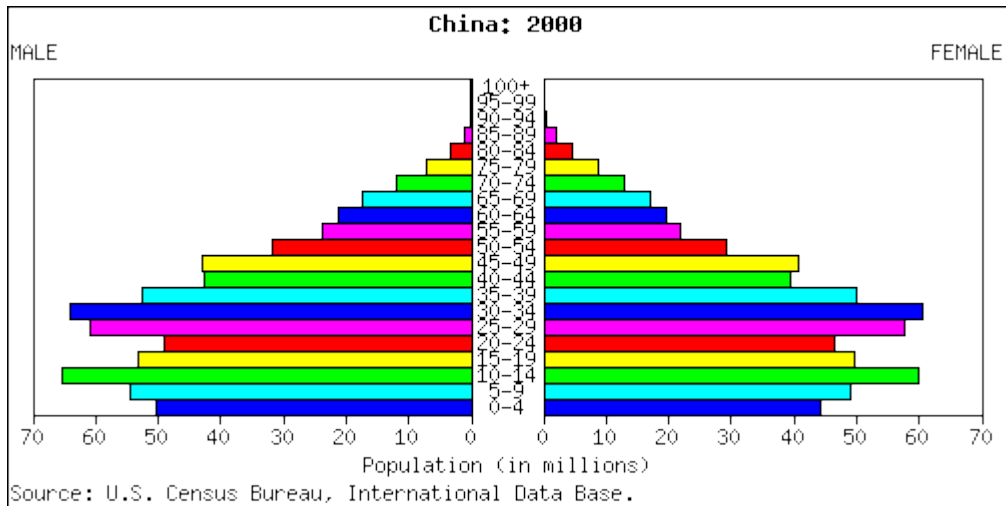
Census data is real data. Students hear about jobs leaving the United States. Population trends in the world will make demands on natural resources that will impact the world economy, the USA economy, and impact job opportunities in all countries.

**Contextual**

Students use population pyramids generated from real census data. They can choose to use a calculator and a variety problem solving strategies.

**Building Expertise**

Students may know how to solve the math problems. This activity helps them understand how they can use the math standard and real data to answer questions, solve problems, and better understand world events.



**China, India, United States Population Pyramids**

# Population Pyramids

Use the population pyramids of China, India, and USA from 2000 to answer the following questions.

1. What was the largest age group in China in 2000? How many males were in this age group? How many females? What was the total population in this age group in 2000?

How will this population group impact China over the next twenty years?

2. What was the largest age group in India in 2000? How many males were in this age group? How many females? What was the total population in this age group in 2000?

How will this population group impact India over the next twenty years?

3. What was the largest age group in the USA in 2000? How many males were in this age group? How many females? What was the total population in this age group in 2000?

How will this population group impact the USA over the next twenty years?

4. What factors could account for the differences in the population pyramids of these three countries?