TEST BANK

Intro Stats

De Veaux Velleman Bock

Includes ActivStats by Paul Velleman

CONTENTS

About This Guide

This Printed Test Bank and Resource Guide is a supplement for you to use in conjunction with your Instructor's Edition of *Intro Stats* 2/e by DeVeaux, Velleman, and Bock. The authors have integrated much of the previous Instructor's Guide into the text, and you will find these sections preceding each chapter. In this Printed Test Bank and Resource Guide, you will find some or all of the following features for each chapter and unit.

Solutions to Class Examples

Answers are provided to the chapter examples presented in the Instructor's Edition of the text.

Assignments

Occasionally the text authors make general suggestions about pace and timing of your work in the chapter, and the amount of reading and the number of exercises you can assign in each chapter. These suggestions have been included in this guide.

Investigative Tasks

Instead of a quiz, you may choose to have students do a written assignment that applies the major concepts of the chapter. Along with each classroom tested task, there is a proposed solution to the task and a scoring rubric you can use as you grade each student's work, then return to them to provide guidance writing clear, complete, concise statistical analyses.

Chapter Quizzes

You might choose to give a quiz after completing a chapter. For each chapter, there are two or three quizzes that you can choose from, along with solutions to these quizzes.

Unit Tests

Two or three sample exams (and solutions) are available for you at the end of each of the text's seven units. These exams, also classroom tested, include multiple choice questions, short questions requiring some calculations or written explanations, and longer questions requiring more in-depth analysis. They are not easy. Understanding Statistics means thinking about the world. All of the problems ask for clear understanding of important concepts, accurate application of statistical techniques, and proper interpretation of the results. Expecting this from the start helps students to get in the habit of clear statistical thinking.

Chapter 1
Stats Starts Here

Make sure to read the Instructor's Guide materials preceding Chapter 1 of the text, as this will give you a sense of the text in terms of tone and setup.

Chapter 1 – Solutions to Class Examples

1. See discussion in IG.

Assignment:

Read Chapter 1. Explore the data collected, and make some observations about the class. What could you report to someone who asked you to describe your class? What did you find interesting (or perhaps surprising) about the class?

Chapter 2
Data

Chapter 2 – Solutions to Class Examples

1. See Class Do's, p. IG 2-A.

2. See Class Example 2.

3. *Consumer Reports*
Who: energy bars
What: brand name, flavor, price, calories, protein, fat
When: not specified
Where: not specified
How: not specified. Are data collected from the label? Are independent tests performed?
Why: information for potential consumers
Categorical variables: brand name, flavor
Quantitative variables: price (US$), number of calories (calories), protein (grams), fat(grams)

Boston Marathon
Who: Boston Marathon runners
What: gender, country, age, time
When: not specified
Where: Boston
How: not specified. Presumably, the data were collected from registration information.
Why: race result reporting
Categorical variables: gender, country
Quantitative variables: age (years), time (hours, minutes, seconds)

Assignments

Have students read Chapter 2. We want students to learn that the book will show them how to use their technology. Students should become able to enter and edit data without help from you.

Assign 3 or 4 of the exercises from Chapter 2. More than that is probably repetitive, but make sure that everyone understands the issues and the importance of reporting at least who and what. Make sure that the *who* they report is about the cases and not, for example, the organization collecting the data.

2-2 Chapter 2 - Data

Statistics Quiz A – Chapter 2 Name _____

1. One of the reasons that the Monitoring the Future (MTF) project was started was "to study changes in the beliefs, attitudes, and behavior of young people in the United States." Data are collected from 8th, 10th, and 12th graders each year. To get a representative nationwide sample, surveys are given to a randomly selected group of students. In Spring 2004, students were asked about alcohol, illegal drug, and cigarette use. Describe the W's, if the information is given. If the information is not given, state that it is not specified.
   - Who:
   - What:
   - When:
   - Where:
   - How:
   - Why:

2. Consider the following part of a data set:

Age (years)	Sex	Only child?	Height (inches)	Weight (pounds)	Credit Hours	GPA	Major
21	Female	Yes	67.00	140.0	16	3.60	animal science
20	Female	No	62.00	130.0	18	3.86	biology
28	Female	No	64.00	188.0	21	3.25	psychology
21	Male	No	65.00	140.0	15	2.95	psychology
24	Female	No	67.00	130.0	20	3.00	anthropology
22	Male	Yes	68.00	135.0	15	2.94	journalism

   List the variables in the data set. Indicate whether each variable is treated as categorical or quantitative in this data set. If the variable is quantitative, state the units.

Statistics Quiz A – Chapter 2 – Key

1. One of the reasons that the Monitoring the Future (MTF) project was started was "to study changes in the beliefs, attitudes, and behavior of young people in the United States." Data are collected from 8^{th}, 10^{th}, and 12^{th} graders each year. To get a representative nationwide sample, surveys are given to a randomly selected group of students. In Spring 2004, students were asked about alcohol, illegal drug, and cigarette use. Describe the W's, if the information is given. If the information is not given, state that it is not specified.
   - Who: 8^{th}, 10^{th}, and 12^{th} graders
   - What: alcohol, illegal drug, and cigarette use
   - When: Spring 2004
   - Where: United States
   - How: survey
   - Why: "to study changes in the beliefs, attitudes, and behavior of young people in the United States"

2. Consider the following part of a data set:

Age (years)	Sex	Only child?	Height (inches)	Weight (pounds)	Credit Hours	GPA	Major
21	Female	Yes	67.00	140.0	16	3.60	animal science
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24	Female	No	67.00	130.0	20	3.00	anthropology
22	Male	Yes	68.00	135.0	15	2.94	journalism

   List the variables in the data set. Indicate whether each variable is treated as categorical or quantitative in this data set. If the variable is quantitative, state the units.

   Categorical: sex, only child?, major
   Quantitative: age (years), height (inches), weight (pounds), credit hours, GPA

Statistics Quiz B – Chapter 2 Name _____

In November 2003 *Discover* published an article on the colonies of ants. They reported some basic information about many species of ants and the results of some discoveries found by myrmecologist Walter Tschinkel of the University of Florida. Information included the scientific name of the ant species, the geographic location, the depth of the nest (in feet), the number of chambers in the nest, and the number of ants in the colony. The article documented how new ant colonies begin, the ant-nest design, and how nests differ in shape, number, size of chambers, and how they are connected, depending on the species. It reported that nest designs include vertical, horizontal, or inclined tunnels for movement and transport of food and ants.

1. Describe the W's, if the information is given:
   - Who:
   - What:
   - When:
   - Where:
   - How:
   - Why:

2. List the variables. Indicate whether each variable is categorical or quantitative. If the variable is quantitative, tell the units.

Statistics Quiz B – Chapter 2 – Key

In November 2003 *Discover* published an article on the colonies of ants. They reported some basic information about many species of ants and the results of some discoveries found by myrmecologist Walter Tschinkel of the University of Florida. Information included the scientific name of the ant species, the geographic location, the depth of the nest (in feet), the number of chambers in the nest, and the number of ants in the colony. The article documented how new ant colonies begin, the ant-nest design, and how nests differ in shape, number, size of chambers, and how they are connected, depending on the species. It reported that nest designs include vertical, horizontal, or inclined tunnels for movement and transport of food and ants.

1. Describe the W's, if the information is given:
   - Who: Colonies of ants. "Many species of ants," but no indication of exactly how many.
   - What: scientific name, geographic location, average nest depth, average number of chambers, average colony size, how new ant colonies begin, the ant-nest design, and how nests differ in architecture.
   - When: November 2003
   - Where: not specified
   - How: The results of some discoveries found by myrmecologist Walter Tschinkel of the University of Florida
   - Why: Information of interest to readers of the magazine

2. List the variables. Indicate whether each variable is categorical or quantitative. If the variable is quantitative, tell the units.
   Categorical: species, geographic location, how new ant colonies begin, and nest design.
   Quantitative: nest depth (feet), number of chambers (units), and colony size (units).

Statistics Quiz C – Chapter 2 Name _____

In June 2003 *Consumer Reports* published an article on some sport-utility vehicles they had tested recently. They reported some basic information about each of the vehicles and the results of some tests conducted by their staff. Among other things, the article told the brand of each vehicle, its price, and whether it had a standard or automatic transmission. They reported the vehicle's fuel economy, its acceleration (number of seconds to go from zero to 60 mph), and its braking distance to stop from 60 mph. The article also rated each vehicle's reliability as much better than average, better than average, average, worse, or much worse than average.

1. Describe the W's, if the information is given:

- Who:
- What:
- When:
- Where:
- How:
- Why:

2. List the variables. Indicate whether each variable is categorical or quantitative. If the variable is quantitative, tell the units.

Statistics Quiz C – Chapter 2 – Key

In June 2003 *Consumer Reports* published an article on some sport-utility vehicles they had tested recently. They reported some basic information about each of the vehicles and the results of some tests conducted by their staff. Among other things, the article told the brand of each vehicle, its price, and whether it had a standard or automatic transmission. They reported the vehicle's fuel economy, its acceleration (number of seconds to go from zero to 60 mph), and its braking distance to stop from 60 mph. The article also rated each vehicle's reliability as much better than average, better than average, average, worse, or much worse than average.

1. Describe the W's, if the information is given:

- Who: SUV's currently on the market. We don't know how many models.
- What: brand, price, transmission, fuel economy, acceleration, braking distance, reliability
- When: prior to June 2003
- Where: not specified, probably the United States
- How: testing the vehicles by driving each
- Why: information for potential consumers

2. List the variables. Indicate whether each variable is categorical or quantitative. If the variable is quantitative, tell the units.
   Categorical: brand, transmission type, reliability
   Quantitative: price (US$), fuel economy (mpg), acceleration (seconds), braking distance (probably feet?)

Chapter 3
Displaying and Describing Categorical Data

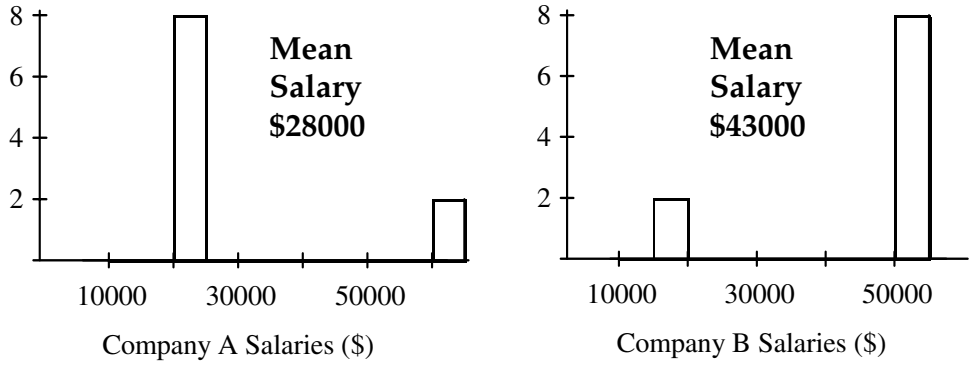
Chapter 3 – Solutions to Class Examples

1. See Class Example 1.

2. Answers will vary depending on your data.

3. See Class Example 3.

4. First of all, make sure you point out that this example deals with quantitative variables, not categorical. The paradox can be explained when you realize that Company A must employ a greater percentage of laborers than Company B. Also, Company A must employ a smaller percentage of managers than Company B. If laborers earn salaries that are considerably lower than managers, the salaries of Company A's laborers will pull the company average down, and the salaries of Company B's managers will pull the company average up.
The proper way to compare the companies is to use the salaries that are broken down by job type. Using the overall average salary leads to a misleading conclusion.



Statistics Quiz A – Chapter 3 Name _____

Has the percentage of young girls drinking milk changed over time? The following table is consistent with the results from "Beverage Choices of Young Females: Changes and Impact on Nutrient Intakes" (Shanthy A. Bowman, *Journal of the American Dietetic Association*, *102*(9), pp. 1234-1239):

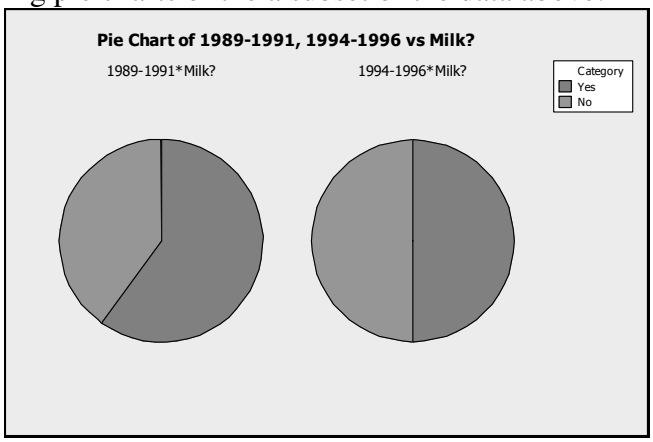
		Nationwide Food Survey Years			
		1987-1988	1989-1991	1994-1996	**Total**
Drinks Fluid Milk	Yes	354	502	366	**1222**
	No	226	335	366	**927**
	Total	**580**	**837**	**732**	**2149**

1. Find the following:
   a. What percent of the young girls reported that they drink milk? _____
   b. What percent of the young girls were in the 1989-1991 survey? _____
   c. What percent of the young girls who reported that they drink milk were in the 1989-1991 survey? _____
   d. What percent of the young girls in 1989-1991 reported that they drink milk? _____

2. What is the marginal distribution of milk consumption?

3. Do you think that milk consumption by young girls is independent of the nationwide survey year? Use statistics to justify your reasoning.

4. Consider the following pie charts of the a subset of the data above:



Do the pie charts above indicate that milk consumption by young girls is independent of the nationwide survey year? Explain.

Statistics Quiz A – Chapter 3 - Key

Has the percentage of young girls drinking milk changed over time? The following table is consistent with the results from "Beverage Choices of Young Females: Changes and Impact on Nutrient Intakes" (Shanthy A. Bowman, *Journal of the American Dietetic Association*, *102*(9), pp. 1234-1239):

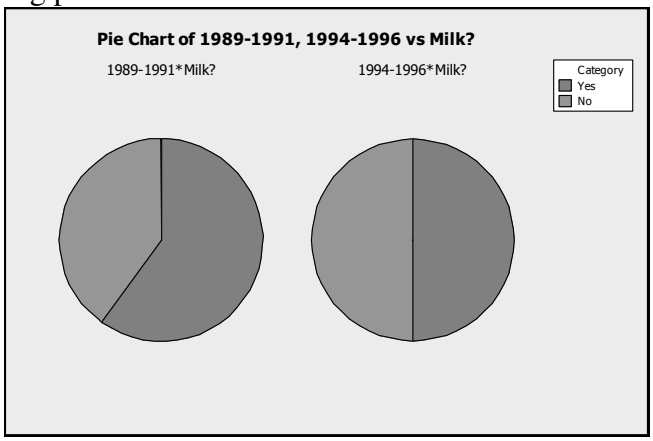
		Nationwide Food Survey Years			
		1987-1988	1989-1991	1994-1996	**Total**
Drinks Fluid Milk	Yes	354	502	366	**1222**
	No	226	335	366	**927**
	Total	**580**	**837**	**732**	**2149**

1. Find the following:
   a. What percent of the young girls reported that they drink milk? 56.9%
   b. What percent of the young girls were in the 1989-1991 survey? 38.9%
   c. What percent of the young girls who reported that they drink milk were in the 1989-1991 survey? 41.1%
   d. What percent of the young girls in 1989-1991 reported that they drink milk? 60.0%

2. What is the marginal distribution of milk consumption?
   Yes: 56.9%; No: 43.1%

3. Do you think that milk consumption by young girls is independent of the nationwide survey year? Use statistics to justify your reasoning.
   No. 56.9% of all young girls surveyed reported drinking milk, but 60% of the young girls reported drinking milk in the 1989-1991 survey. Since these percentages differ, milk consumption and year are not independent.

4. Consider the following pie charts of the a subset of the data above:



   Do the pie charts above indicate that milk consumption by young girls is independent of the nationwide survey year? Explain.
   No. It looks like there is some sort of relationship between milk consumption and nationwide survey year, since the percentage of young girls who reported drinking milk is a larger slice of the pie chart for the 1989-1991 survey than the same percentage for the 1994-1996 survey.

3-4 Chapter 3 – Displaying and Describing Categorical Data

Statistics Quiz B – Chapter 3 Name _____

To determine if people's preference in dogs had changed in the recent years, organizers of a local dog show asked people who attended the show to indicate which breed was their favorite. This information was compiled by dog breed and gender of the people who responded. The table summarizes the responses.

	Female	**Male**	**Total**
Yorkshire Terrier	73	59	**132**
Dachshund	49	47	**96**
Golden Retriever	58	33	**91**
Labrador	37	41	**78**
Dalmatian	45	28	**73**
Other breeds	86	67	**153**
Total	**348**	**275**	**623**

1. Identify the variables and tell whether each is categorical or quantitative.

2. Which of the W's are unknown for these data?

3. Find each percent.
   a. What percent of the responses were from males who favor Labradors? _____
   b. What percent of the male responses favor Labradors? _____
   c. What percent of the people who choose Labradors were males? _____

4. What is the marginal distribution of breeds?

5. Write a sentence or two about the conditional relative frequency distribution of the breeds among female respondents.

6. Do you think the breed selection is independent of gender? Give statistical evidence to support your conclusion.

Statistics Quiz B – Chapter 3 – Key

To determine if people's preference in dogs had changed in the recent years, organizers of a local dog show asked people who attended the show to indicate which breed was their favorite. This information was compiled by dog breed and gender of the people who responded. The table summarizes the responses.

	Female	Male	Total
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Golden Retriever	58	33	**91**
Labrador	37	41	**78**
Dalmatian	45	28	**73**
Other breeds	86	67	**153**
Total	**348**	**275**	**623**

1. Identify the variables and tell whether each is categorical or quantitative.

   Gender and Breed; both categorical.

2. Which of the W's are unknown for these data?
   We do not know how or when the people were surveyed, or where the local dog show was located.

3. Find each percent.
   a. What percent of the responses were from males who favor Labradors? 6.6%
   b. What percent of the male responses favor Labradors? 14.9%
   c. What percent of the people who choose Labradors were males? 52.6%

4. What is the marginal distribution of breeds?
   There were 132 Yorkshire terrier responses, 96 Dachshund responses, 91 Golden Retriever responses, 78 Labrador responses, 73 Dalmatian responses, and 153 Other responses.

5. Write a sentence or two about the conditional relative frequency distribution of the breeds among female respondents.
   Overall 55.9% of people responding were females. The majority of the people who selected Golden Retrievers were female (63.7%), 61.6% of people selecting Dalmatians were female, 55.3% of people selecting Yorkshire Terriers were female, 51.0% of people selecting Dachshunds were female, and 56.2% of the people selecting other breeds were female, while only 47.4% of people selecting Labradors were female.

6. Do you think the breed selection is independent of gender? Give statistical evidence to support your conclusion.
   The breed selection does not appear to be independent of gender. The overall percentage of responses is 55.9% female and 44.1% male. There are two breeds favored by a much higher percentage of females – Golden Retriever (64%) and Dalmatian (62%), and one breed favored by a much smaller percentage of females – Labrador (47%).

3-6 Chapter 3 – Displaying and Describing Categorical Data

Statistics Quiz C – Chapter 3 Name _____

In order to plan transportation and parking needs at a private high school, administrators asked students how they get to school. Some rode a school bus, some rode in with parents or friends, and others used "personal" transportation – bikes, skateboards, or just walked. The table summarizes the responses from boys and girls.

	Male	**Female**	**Total**
Bus	30	34	**64**
Ride	37	45	**82**
Personal	19	23	**42**
Total	**86**	**102**	**188**

1. Identify the variables and tell whether each is categorical or quantitative.

2. Which of the W's are unknown for these data?

3. Find each percent.
   a) What percent of the students are girls who ride the bus? _____
   b) What percent of the girls ride the bus? _____
   c) What percent of the bus riders are girls? _____

4. What is the marginal distribution of gender?

5. Write a sentence or two about the conditional relative frequency distribution of modes of transportation for the boys.

6. Do you think mode of transportation is independent of gender? Give statistical evidence to support your conclusion.

Statistics Quiz C – Chapter 3 – Key

In order to plan transportation and parking needs at a private high school, administrators asked students how they get to school. Some rode a school bus, some rode in with parents or friends, and others used "personal" transportation – bikes, skateboards, or just walked. The table summarizes the responses from boys and girls.

	Male	**Female**	**Total**
Bus	30	34	**64**
Ride	37	45	**82**
Personal	19	23	**42**
Total	**86**	**102**	**188**

1. Identify the variables and tell whether each is categorical or quantitative.

   Gender and mode of transportation, both categorical.

2. Which of the W's are unknown for these data?
   We don't know how or when the students were surveyed, nor where the school is.

3. Find each percent.
   a) What percent of the students are girls who ride the bus? 18.0%
   b) What percent of the girls ride the bus? 33.0%
   c) What percent of the bus riders are girls? 53.0%

4. What is the marginal distribution of gender?
   There are 86 males and 102 females.

5. Write a sentence or two about the conditional relative frequency distribution of modes of transportation for the boys.
   More boys (43%) caught rides to school than any other means of transportation. 35% rode the bus while only 22% used personal transportation like biking, skateboarding, or walking.

6. Do you think mode of transportation is independent of gender? Give statistical evidence to support your conclusion.
   The way students get to school does seem to be independent of gender. Overall, 34% of students ride the bus, compared to 35% of the boys and 33% of the girls. 44% of all students caught rides with someone and 22% used personal transportation, almost the same as the percentages for boys (43% and 22%) or girls (44% and 23%) separately. These data provide little indication of a difference in mode of transportation between boys and girls at this school.

Chapter 4
Displaying Quantitative Data

Chapter 4 – Solutions to Class Examples and Activities

1. Answers will vary depending on your data.

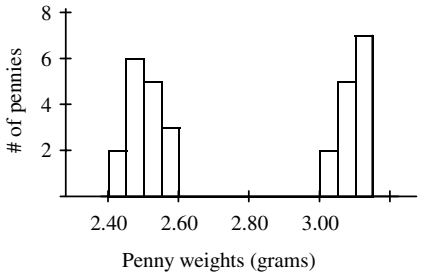
2. See Class Example 2.

3. The penny example is explained below. For other explanations, see Class Example 3.

Think

We are assuming that the pennies we are weighing are a representative sample of all pennies minted.

Show



Tell

The distribution of weights of pennies is bimodal, with a cluster of weights around 2.5 grams, and another cluster of weights around 3.1 grams. Within each cluster, the distribution of weights is fairly compact. A little research tells us that the mint stopped using copper and started using zinc in the early 1980s and started using zinc. What we thought was one population of pennies was actually two: those minted before the switch, and those minted after the switch.

4. Using a histogram, we could learn about the shape, center, spread, and unusual features of the distribution of snowfall in December in Bismarck, North Dakota. We would be able to see the average snowfall over the 100-year period, how spread out the distribution of snowfalls was, and whether the distribution was unimodal, bimodal, skewed, or uniform. Using a timeplot, we could learn whether or not December snowfall totals are increasing, decreasing, or staying the same year to year over the 100-year period.

Assignments

A chapter of reading and 5 - 6 exercises for the chapter may be about right. As students read the chapter, they should pay attention to the WCGW section. The Ithaca times graph is a beaut!

Encourage students to be on the lookout for bad graphs in print. During the year they'll turn up others. (If any are really fun, please send them to us!)

Intro Stats - Investigative Task Chapter 4

Dollars for Students

In 2000 the Department of Education published the *Digest for Education Statistics*, a collection of information about education in the United States. They reported the average amount (dollars per student) spent by public schools in each state during the school year 1997-8. The following table divides the states according to whether they lie east or west of the Mississippi River. Write a report comparing the amounts eastern and western states spend to educate their children.

Eastern State	$ per Student	Western State	$ per Student
Alabama	5,166	Alaska	9,074
Connecticut	9,221	Arizona	5,122
Delaware	7,963	Arkansas	4,999
D.C.	9,225	California	5,795
Florida	6,183	Colorado	6,099
Georgia	5,947	Hawaii	6,409
Illinois	6,858	Idaho	5,012
Indiana	6,786	Iowa	6,295
Kentucky	6,125	Kansas	6,406
Maine	7,238	Louisiana	5,645
Maryland	7,812	Minnesota	6,795
Massachusetts	8,299	Missouri	6,096
Michigan	7,717	Montana	6,448
Mississippi	4,575	Nebraska	6,584
New Hampshire	6,487	Nevada	5,758
New Jersey	10,233	New Mexico	4,984
New York	9,970	North Dakota	5,353
North Carolina	5,667	Oklahoma	5,398
Ohio	6,808	Oregon	7,348
Pennsylvania	7,777	South Dakota	5,281
Rhode Island	8,627	Texas	5,910
South Carolina	5,643	Utah	4,256
Tennessee	5,274	Washington	6,534
Vermont	7,500	Wyoming	6,718
Virginia	5,938		
West Virginia	6,779		
Wisconsin	7,680		

A complete report will include a visual display (stem-and-leaf plot) and a well-written comparison of the distributions of expenditures (in context, of course).

Intro Stats Task **Chapter 4**

	Components	Comments
Think	Demonstrates clear understanding of how to make a complete statistical comparison of the two distributions	
Show	**Visual**: o stem-and-leaf plots o comparative (same scale) o well-labeled o correctly constructed	
Tell	**Verbal** : States conclusions about differences in expenditures, including… o shapes (E skewed, W symmetric) o center (higher in E) o spread (greater variability in E) o unusual features (outlier in W) The written analysis… o is clear and concise o identifies the W's o uses the proper context o uses vocabulary correctly o avoids speculation	

Components are scored as **E**ssentially correct, **P**artially correct, or **I**ncorrect

1: **The Graph**

E – Has all 4 features

P – Is comparative (perhaps histograms) but constructed or labeled poorly

I – Graph is not comparative (different scales, perhaps), is incorrect, or is missing

2: **Shape and Center –** Conclusion observes generally higher spending in the East, compares centers, and describes shapes.

E – States general conclusion, estimates centers, and correctly describes shapes.

P – General conclusion not clear, or centers or shapes missing or incorrect

I – Comparison of shapes and centers missing or incorrect

3: Spread and Outliers

E – Observes greater variability in the East and identifies the outlier in the West.

P – Comparison of spread is not clear, or fails to mention the outlier.

I – Comparison of spread is missing or incorrect.

4: Writing

E – Written comparison has all 5 listed properties.

P – Written comparison has 3 or 4 of the listed properties.

I – Written comparison has fewer than 3 of the properties.

Scoring

- E's count 1 point, P's are 1/2
- Score = sum of 4 components; rounding based on overall communication quality
- Grade: A = 4, B = 3, etc., with +/- based on rounding (ex: 3.5 rounded to 3 is a B+)

Chapter 4 – Investigative Task Sample Solution – Dollars for Students

A Department of Education publication, *Digest for Education Statistics*, published a collection of educational information in 2000. Among the data reported was information on average educational spending by state during the 1997-1998 school year, in dollars per student.

The distribution of the average number of education dollars spent by western states is roughly unimodal and symmetric. A typical western state spends about $5500 per student per year. The overwhelming majority of western states spend between $4000 and $7000 per student per year. The state of Alaska is an exception, spending around $9000 per student per year.

Dollars Spent per Student

Western States		Eastern States
2	4	
99	4	5
33210	5	12
9776	5	6699
444200	6	114
7755	6	7788
3	7	2
	7	567789
	8	2
	8	6
0	9	22
	9	9
	10	2
	10	

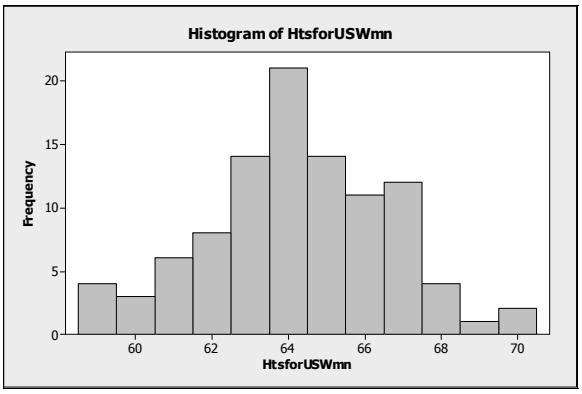
Key : 6|7 = 6000 - 6999
dollars spent per student

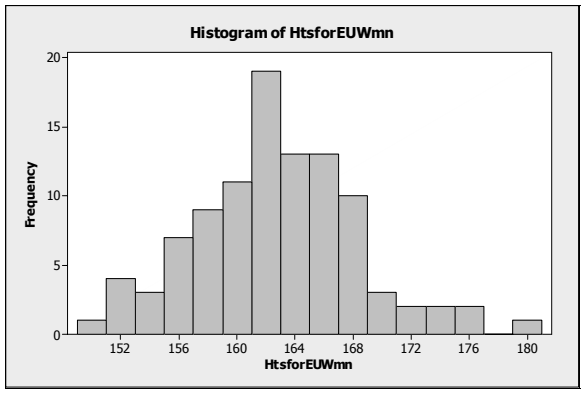
The distribution of the average number of education dollars spent by eastern states is skewed to the right, with states spending from about $4500 to $10,200 per student per year. A typical eastern state spends about $7000 per student per year.

Generally, the average education spending per student per year is higher in the eastern states than in the western states. However, education spending in the east is much more variable than education spending in the west.

Statistics Quiz A – Chapter 4 Name _____

The following are histograms for the heights of 100 US women and the heights of 100 European women:

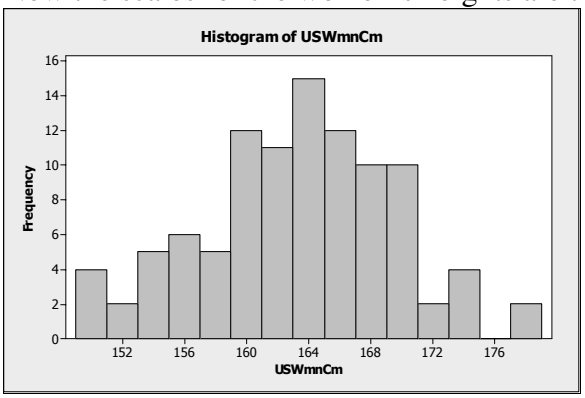


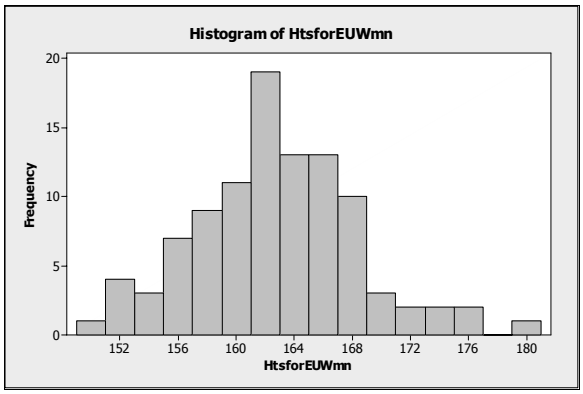


Note that the scales for the women's heights are very different, and thus it makes it hard to make a comparison between the heights of these women in the US and in Europe.

1. What might the cause of this difference in scale be?

Now the scales for the women's heights are the same…



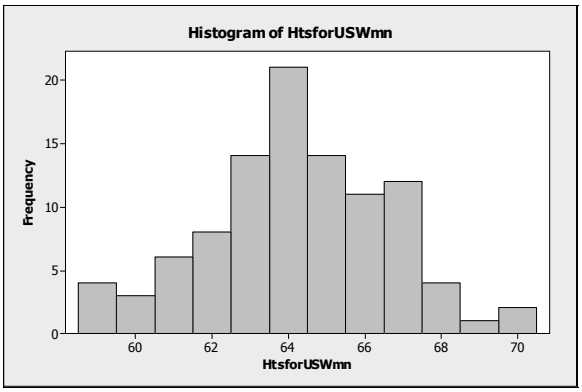


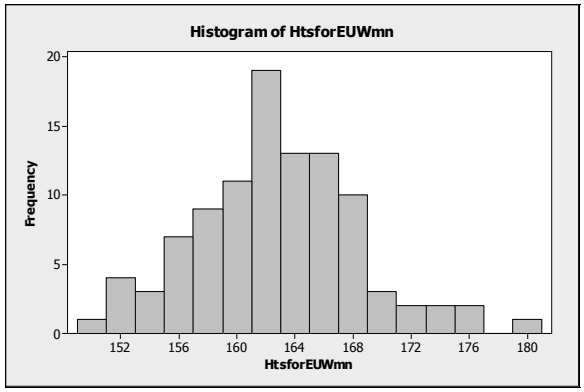
2. Compare the two distributions of the women's heights. Be sure to talk about shape, center, and spread.

3. While the scales for the second set of histograms are the same, there is still something that could be improved so that we could compare these two distributions better. Identify this improvement and explain why it would be better.

Statistics Quiz A – Chapter 4 – Key

The following are histograms for the heights of 100 US women and the heights of 100 European women:

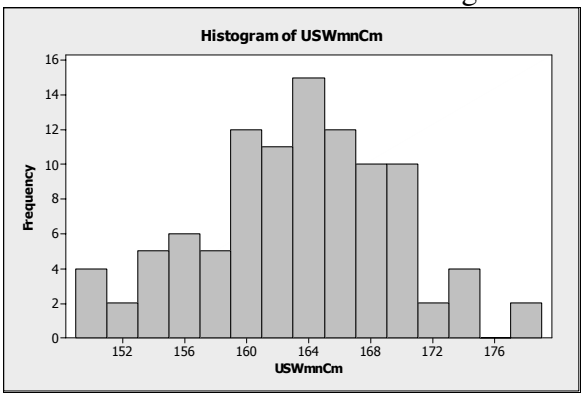


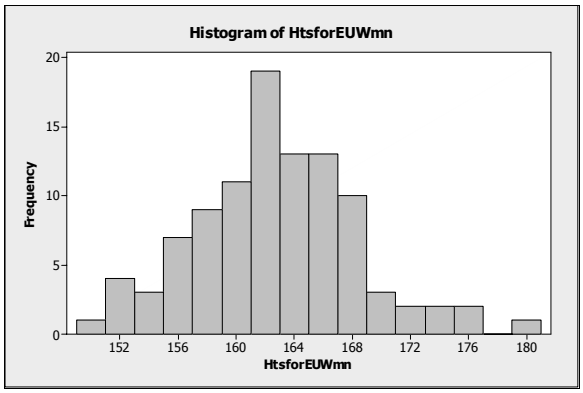


Note that the scales for the women's heights are very different, and thus it makes it hard to make a comparison between the heights of these women in the US and in Europe.

1. What might the cause of this difference in scale be?
   The heights of women in the US were measured in inches, while the heights of women in Europe were measured in centimeters.

Now the scales for the women's heights are the same…





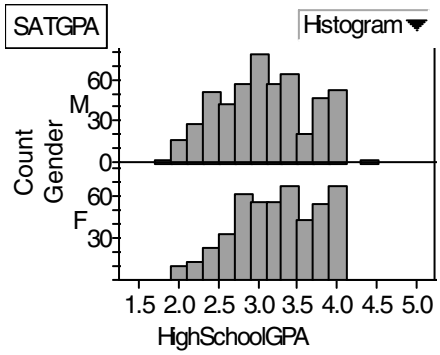
2. Compare the two distributions of the women's heights. Be sure to talk about shape, center, and spread.
   Both distributions are unimodal and roughly symmetric. Each distribution appears to be centered around 164 cm. The heights for the US women appear to be more spread out than those for the European women.

3. While the scales for the second set of histograms are the same, there is still something that could be improved so that we could compare these two distributions better. Identify this improvement and explain why it would be better.
   The frequency scales are not the same for the two histograms. If we converted each of the frequency histograms to a relative frequency histogram, we would be better able to compare the frequencies for each distribution at the heights.

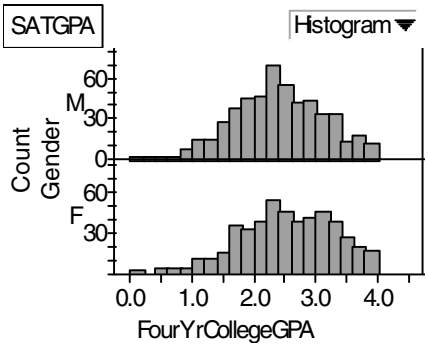
Statistics Quiz B – Chapter 4 Name _____

One thousand students from a local university were sampled to gather information such as gender, high school GPA, college GPA, and total SAT scores. The results were used to create the histograms shown below.

1. Here is a histogram displaying high school grade point averages (GPA's). Describe the grade distribution of females.

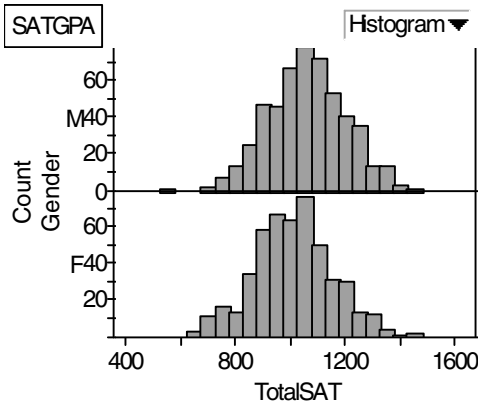


2. Here is the same information for college grades. Compare the grade distributions for males in high school and college.



3. What aspect of the graphs for high school and college grades makes the comparison difficult?

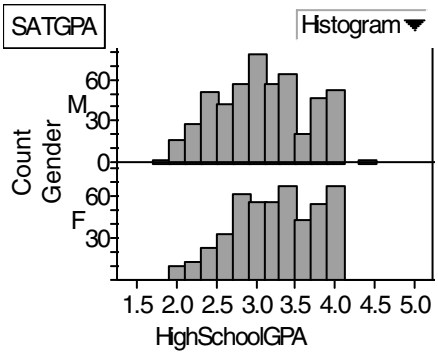
4. Here is a histogram displaying total SAT scores for the same students. Write a few sentences summarizing the display.



Statistics Quiz B – Chapter 4 – Key

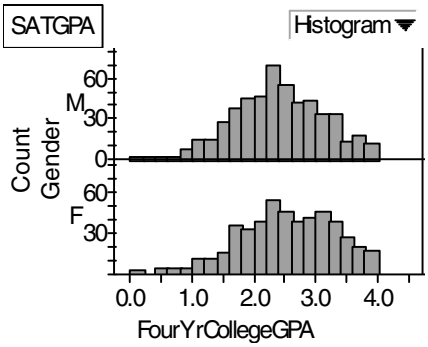
One thousand students from a local university were sampled to gather information such as gender, high school GPA, college GPA, and total SAT scores. The results were used to create the histograms shown below.

1. Here is a histogram displaying high school grade point averages (GPA's). Describe the grade distribution of females.



   The distribution of females is skewed left, bimodal at 3.4 and 4.0, centered between 3.0 and 3.5, and has a spread of 2.3.

2. Here is the same information for college grades. Compare the grade distributions for males in high school and college.

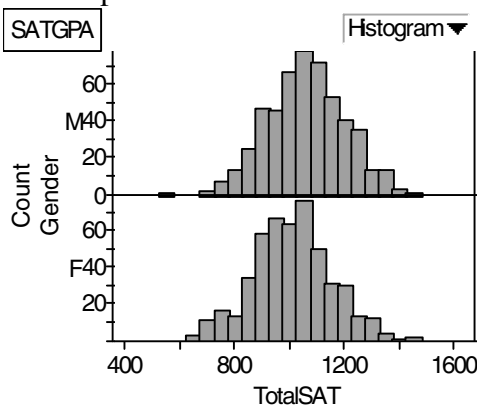


   While the high school GPA's of males appear slightly skewed left, the college GPA's of males appear to be roughly symmetric between 1.0 and 4.0, with a few males having GPA's between 0.0 and 1.0.The high school GPA's for males are higher, centered near 3.0, while the college GPA's are centered near 2.0. The spread of the high school GPA's for males is approximately 2.5, while the spread for college GPA's for males is close to 4.0.

3. What aspect of the graphs for high school and college grades makes the comparison difficult?
   The graphs are not side by side, and the graphs are not created on the exact same scale.

4. Here is a histogram displaying total SAT scores for the same students. Write a few sentences summarizing the total SAT scores of males and females.

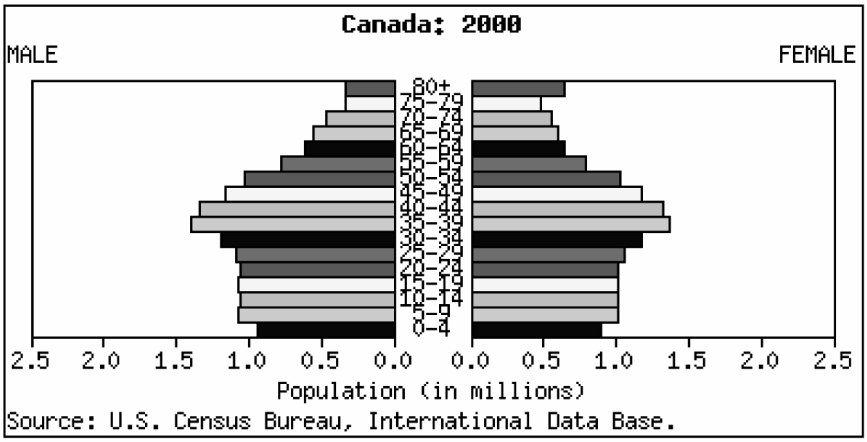
   Both distribution appear to approximately symmetrical with peaks at 1000. The distribution of male scores appears to be centered a little higher than the distribution of the female scores. The distribution of male scores has an outlier around 575. The spread of the total SAT scores for males is approximately 900, while the spread for females is approximately 800.



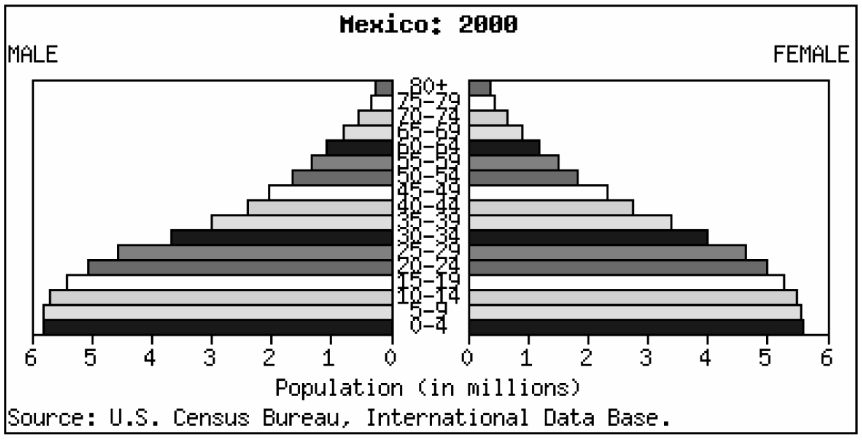
Statistics Quiz C – Chapter 4 Name _____

At www.census.gov you can create a "population pyramid" for any country. The pyramids are back-to-back histograms showing the number of males and females in 5-year age brackets.

1. Here's one for Canada for the year 2000. Describe the age distribution of Canadian females.

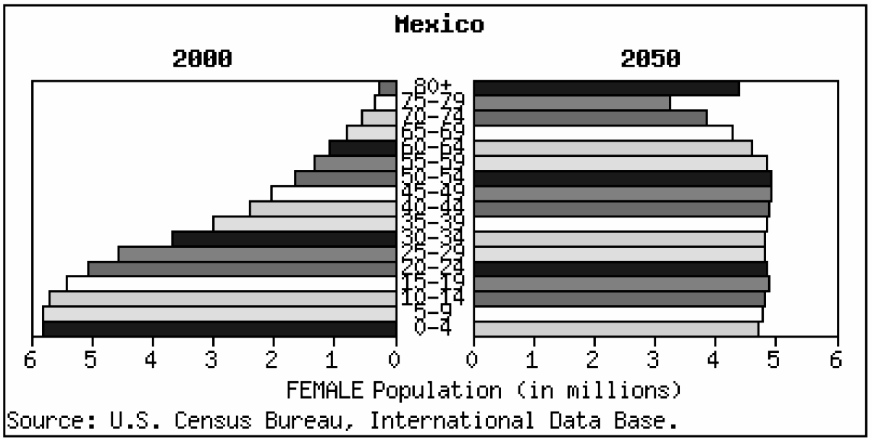


2. Here's the same information for Mexico. Compare the age distributions for males in Canada and Mexico.



3. What aspect of the graphs for Canada and Mexico makes the comparison difficult?

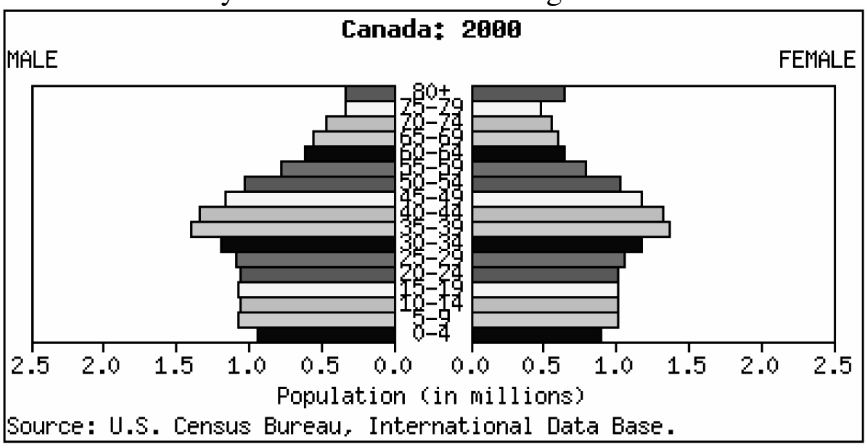
4. This pyramid shows Mexico's 2000 female population and the census bureau's projection for 2050. Write a few sentences summarizing the changes that are forecast.



Statistics Quiz C – Chapter 4 – Key

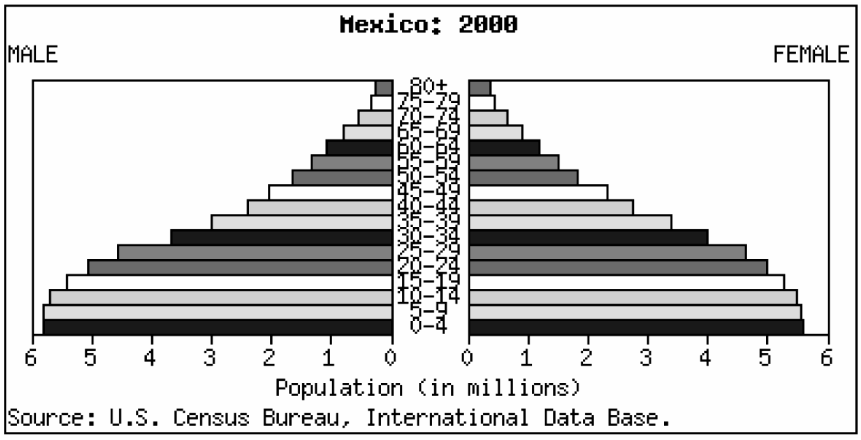
At www.census.gov you can create a "population pyramid" for any country. The pyramids are back-to-back histograms showing the number of males and females in 5-year age brackets.

1. Here's one for Canada for the year 2000. Describe the age distribution of Canadian females.



The distribution of ages of Canadian females is unimodal, centered in the late 30's, and slightly skewed to the right. Under the age of 30 the distribution is relatively uniform with about a million women in each 5-year age bracket. For age 50 and above, the number of females in each age group decreases steadily, though many are over 80.

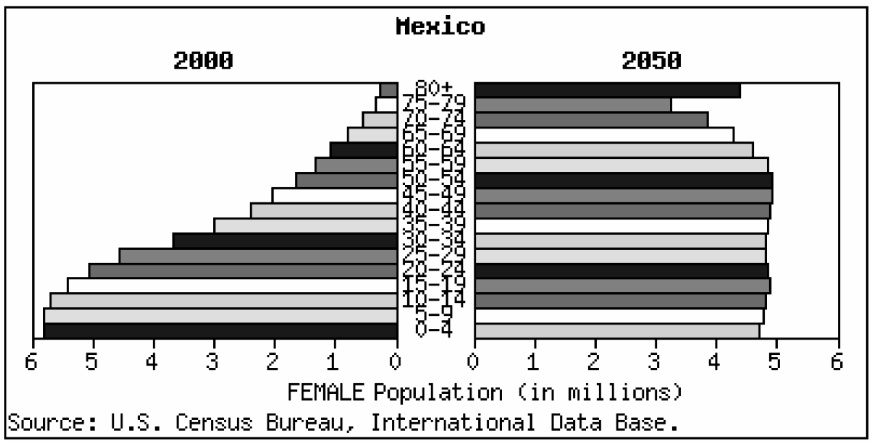
2. Here's the same information for Mexico. Compare the age distributions for males in Canada and Mexico.



In Mexico the male population is generally much younger, centered in the late 20's compared to the late 30's in Canada. While ages of Canadian males are slightly skewed to the right, the ages are strongly skewed to the right in Mexico, where the bulk of the population is under 30. Though males in both countries live to be over 80, the ages are much more spread out in Canada than in Mexico where the largest cluster of ages is under 20.

3. What aspect of the graphs for Canada and Mexico makes the comparison difficult?
The two graphs are not side-by-side, and are not plotted on the same scale.

4. This pyramid shows Mexico's 2000 female population and the census bureau's projection for 2050. Write a few sentences summarizing the changes that are forecast.



The Census Bureau projects dramatic changes in the female population of Mexico over the next 50 years. The current distribution of ages is strongly skewed to the right with most of the women under 30 and far fewer 50 and above. By 2050 the population will become more uniform across age groups from 0 to 60, and we anticipate an unusually large number of women over 80.