Lesson 2: Bar Graphs

A Statistical Skyline Account

When students first learn about statistics, they often deal with small datasets, such as the number of students born on each day of the month. For this activity, you can use real-world data, such as the number of students born on each day of a school's fiscal year. This data can be presented in a bar graph, with the y-axis representing the frequency of each day and the x-axis representing the days of the month.

For the first graph, you can use the data from one school year. For the second graph, you can use the data from the previous school year. This will allow students to see how the data has changed over time.

Teacher Tip:
The charts shown in this activity are intended to be used as examples. You can use your own school's data to create similar charts. If you do not have access to school records, you can use data from a local library or a newspaper.

Lesson 4

Looking Through Line Graphs

The world is full of changes. As students learn to read line graphs, they will be able to see how these changes occur over time. Line graphs are used to display trends in data, which is important for making predictions. For example, a line graph could be used to show the number of students born on each day of a school's fiscal year.

Teacher Tip:
You can use your own school's data to create a line graph, or you can use data from a local library or a newspaper.

Lesson 5

Direct students to the “Line It Up” question on the reproducible.

(a) Students not using water = 496.7 gallons saved
(b) Yard not watered = 327.5 gallons saved
(c) 3,200 gallon-sized bottles x 0.018 gallons of oil per bottle = 57.6 gallons saved
(d) 450 kilowatt-hours x $0.15 = $67.50 saved per item
(e) 1,210 kilowatt-hours x $0.15 = $181.50
(f) 450 kilowatt-hours x $0.15 = $67.50
(g) 1.2 + 23.4 = 24.6 million tons recycled total
(h) 85 gallons x $1 = $85; 85 gallons x 0.002 (fountain) = $0.17
(i) 8,500,000,000 
(j) 11,500,000,000

Lesson 2: Bar Graphs

A Statistical Skyline Account

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Lesson 2: Bar Graphs

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(i) 8,500,000,000 
(j) 11,500,000,000
Lesson 2: Bar Graphs: A Statistical Skyline

**Lesson Overview**

- **Objective**: Students will learn how to use bar graphs to represent, analyze, and generalize data.
- **Preparation**: Before the lesson, students should have some basic knowledge of statistics and be familiar with the concept of bar graphs.

**Teaching Guide**

- **Materials Needed**: Bar graph reproducibles, colored pencils, calculators.
- **Procedure**:
  1. Discuss the importance of bar graphs in representing data.
  2. Explain how to read a bar graph, focusing on the scale, labels, and data represented.
  3. Use the reproducibles to demonstrate different types of bar graphs and their applications.
  4. Have students work in pairs to create their own bar graphs for a given data set.
  5. Review the answers as a class.

** reproducibles**

- **Answers**
  - a.
  - b.
  - c.
  - d.
  - e.

**BONUS ACTIVITY 3: Tap the Math Facts**

- **Objective**: Students will practice their math facts using a real-world scenario.
- **Procedure**:
  1. Provide students with a scenario involving real-world math facts.
  2. Have students use bar graphs to represent the data and solve the problem.
  3. Discuss the solution as a class.

**reproducibles**

- **Answers**
  - a.
  - b.
  - c.
  - d.

**DIRECTIONS**

- **Objective**: Students will learn how to interpret and analyze data using bar graphs.
- **Procedure**:
  1. Provide students with a set of data and a bar graph.
  2. Have students complete questions based on the bar graph.
  3. Discuss the answers as a class.

** reproducibles**

- **Answers**
  - a.
  - b.
  - c.

**Lesson 3: Looking Through Line Graphs**

**Lesson Overview**

- **Objective**: Students will learn how to use line graphs to represent, analyze, and generalize data.
- **Preparation**: Before the lesson, students should have some basic knowledge of statistics and be familiar with the concept of line graphs.

**Teaching Guide**

- **Materials Needed**: Line graph reproducibles, colored pencils, calculators.
- **Procedure**:
  1. Discuss the importance of line graphs in representing data.
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  3. Use the reproducibles to demonstrate different types of line graphs and their applications.
  4. Have students work in pairs to create their own line graphs for a given data set.
  5. Review the answers as a class.

**reproducibles**

- **Answers**
  - a.
  - b.
  - c.
  - d.
  - e.

**BONUS ACTIVITY 3: Tap the Math Facts**

- **Objective**: Students will practice their math facts using a real-world scenario.
- **Procedure**:
  1. Provide students with a scenario involving real-world math facts.
  2. Have students use line graphs to represent the data and solve the problem.
  3. Discuss the solution as a class.

**reproducibles**

- **Answers**
  - a.
  - b.
  - c.
  - d.

**DIRECTIONS**

- **Objective**: Students will learn how to interpret and analyze data using line graphs.
- **Procedure**:
  1. Provide students with a set of data and a line graph.
  2. Have students complete questions based on the line graph.
  3. Discuss the answers as a class.

** reproducibles**

- **Answers**
  - a.
  - b.
  - c.

**Lesson 4: Circle Graphs (Pie Charts)**

**Lesson Overview**

- **Objective**: Students will learn how to use circle graphs to represent, analyze, and generalize data.
- **Preparation**: Before the lesson, students should have some basic knowledge of statistics and be familiar with the concept of circle graphs.

**Teaching Guide**

- **Materials Needed**: Circle graph reproducibles, colored pencils, calculators.
- **Procedure**:
  1. Discuss the importance of circle graphs in representing data.
  2. Explain how to read a circle graph, focusing on the scale, labels, and data represented.
  3. Use the reproducibles to demonstrate different types of circle graphs and their applications.
  4. Have students work in pairs to create their own circle graphs for a given data set.
  5. Review the answers as a class.

**reproducibles**

- **Answers**
  - a.
  - b.
  - c.
  - d.
  - e.

**BONUS ACTIVITY 3: Tap the Math Facts**

- **Objective**: Students will practice their math facts using a real-world scenario.
- **Procedure**:
  1. Provide students with a scenario involving real-world math facts.
  2. Have students use circle graphs to represent the data and solve the problem.
  3. Discuss the solution as a class.

**reproducibles**

- **Answers**
  - a.
  - b.
  - c.
  - d.

**DIRECTIONS**

- **Objective**: Students will learn how to interpret and analyze data using circle graphs.
- **Procedure**:
  1. Provide students with a set of data and a circle graph.
  2. Have students complete questions based on the circle graph.
  3. Discuss the answers as a class.
Lesson Overview

In this lesson, students will learn about line graphs and bar graphs, and practice using these types of graphs to represent and analyze data.

Lesson 2: Bar Graphs: A Statistical Skyline

• Review the definition of a bar graph.
• Explain that a bar graph is used to represent and analyze information through changes over time and how to propose and justify predictions based on bar graph analysis.
• Materials: pencils, calculators

Lesson 3: Looking Through Line Graphs

• Review the definition of a line graph.
• Explain that a line graph is used to represent and analyze information through changes over time.
• Materials: pencils, calculators

Teaching Guide & Poster

Align with NCTM Standards

Reproducibles Answer Key (continued)

Lesson 3: Looking Through Line Graphs

• Materials: pencils, calculators

For more information on line graphs, bar graphs, and pie charts, visit www.actuarialfoundation.org.

Teaching Guide & Poster

Align with NCTM Standards

Reproducibles Answer Key (continued)

Lesson 3: Looking Through Line Graphs

• Materials: pencils, calculators

For more information on line graphs, bar graphs, and pie charts, visit www.actuarialfoundation.org.

Teaching Guide & Poster

Align with NCTM Standards

Reproducibles Answer Key (continued)

Lesson 3: Looking Through Line Graphs

• Materials: pencils, calculators

For more information on line graphs, bar graphs, and pie charts, visit www.actuarialfoundation.org.

Teaching Guide & Poster

Align with NCTM Standards

Reproducibles Answer Key (continued)

Lesson 3: Looking Through Line Graphs

• Materials: pencils, calculators

For more information on line graphs, bar graphs, and pie charts, visit www.actuarialfoundation.org.

Teaching Guide & Poster

Align with NCTM Standards

Reproducibles Answer Key (continued)

Lesson 3: Looking Through Line Graphs

• Materials: pencils, calculators

For more information on line graphs, bar graphs, and pie charts, visit www.actuarialfoundation.org.

Teaching Guide & Poster

Align with NCTM Standards

Reproducibles Answer Key (continued)

Lesson 3: Looking Through Line Graphs

• Materials: pencils, calculators

For more information on line graphs, bar graphs, and pie charts, visit www.actuarialfoundation.org.

Teaching Guide & Poster

Align with NCTM Standards

Reproducibles Answer Key (continued)

Lesson 3: Looking Through Line Graphs

• Materials: pencils, calculators

For more information on line graphs, bar graphs, and pie charts, visit www.actuarialfoundation.org.

Teaching Guide & Poster

Align with NCTM Standards

Reproducibles Answer Key (continued)

Lesson 3: Looking Through Line Graphs

• Materials: pencils, calculators

For more information on line graphs, bar graphs, and pie charts, visit www.actuarialfoundation.org.

Teaching Guide & Poster

Align with NCTM Standards

Reproducibles Answer Key (continued)

Lesson 3: Looking Through Line Graphs

• Materials: pencils, calculators

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Teaching Guide & Poster

Align with NCTM Standards

Reproducibles Answer Key (continued)

Lesson 3: Looking Through Line Graphs

• Materials: pencils, calculators

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Teaching Guide & Poster

Align with NCTM Standards

Reproducibles Answer Key (continued)

Lesson 3: Looking Through Line Graphs

• Materials: pencils, calculators

For more information on line graphs, bar graphs, and pie charts, visit www.actuarialfoundation.org.
**Activity 1: Peering into Pie Charts**

**Make a Paper Pie**

Americans are recycling more than ever before, but some topics are still thrown away every single day. Let's answer the question: how much can be recycled? They take a long time to decompose. Complete the questions below to see how many tons of recycling can be realized from the pyramid equation.

**Materials Needed for Recycling**

- Paper (by the ream)
- Shredded paper
- Plastics: the number of cartons recovered
- Metals: the number of cartons recovered
- Glass: the number of cartons recovered
- Food: the number of cartons recovered
- Paper: the number of cartons recovered
- Old Homework: the number of cartons recovered
- Posters & Artwork: the number of cartons recovered
- Lunch Menus: the number of cartons recovered
- Permission Slips: the number of cartons recovered

1. **Tons Recovered by Recycling**

   - Paper: 1,000 tons
   - Plastics: 7.5 million tons
   - Metals: 3.3 million tons
   - Glass: 2 million tons
   - Food: 80 million tons
   - Old Homework: 40 tons
   - Posters & Artwork: 10 tons
   - Lunch Menus: 15 tons
   - Permission Slips: 10 tons
   - Total: 193.2 million tons

2. **To Landfill**

   - Paper: 100,000 tons
   - Plastics: 22.5 million tons
   - Metals: 360,000 tons
   - Glass: 15 million tons
   - Food: 25,000 tons
   - Old Homework: 22.5 million tons
   - Posters & Artwork: 60 tons
   - Lunch Menus: 7.5 million tons
   - Permission Slips: 60 tons
   - Total: 258.2 million tons

3. **Graph It**

   - Paper: 1,000 tons
   - Plastics: 7.5 million tons
   - Metals: 3.3 million tons
   - Glass: 2 million tons
   - Food: 80 million tons
   - Old Homework: 40 tons
   - Posters & Artwork: 10 tons
   - Lunch Menus: 15 tons
   - Permission Slips: 10 tons
   - Total: 193.2 million tons

4. **Calculate the Percentages**

   - Paper: 5% (1,000 tons / 20,000 tons)
   - Plastics: 37% (7.5 million tons / 20,000 tons)
   - Metals: 17% (3.3 million tons / 20,000 tons)
   - Glass: 10% (2 million tons / 20,000 tons)
   - Food: 40% (80 million tons / 200 tons)
   - Old Homework: 2% (40 tons / 200 tons)
   - Posters & Artwork: 0.5% (10 tons / 200 tons)
   - Lunch Menus: 0.75% (15 tons / 200 tons)
   - Permission Slips: 0.5% (10 tons / 200 tons)
   - Total: 100%
ACTIVITY 1: Peering into Pie Charts
Make a Paper Pie

Millions of trees are used each year to make paper. Study the number of trees used for each of the main column categories. Then, show there by making a pie chart. How many trees were used for each of the main categories?

ACTIVITY 2: Bar Charts—A Statistical Skyline
Raising the Recycling Bar

In the table below, calculate the amount of material saved if 4,000 tons of paper were recycled. Add any amounts that total columns.

<table>
<thead>
<tr>
<th>Material Saved</th>
<th>Amount SAVED (tons)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paper</td>
<td>2,500</td>
</tr>
<tr>
<td>Plastics</td>
<td>1,000</td>
</tr>
<tr>
<td>Glass</td>
<td>500</td>
</tr>
<tr>
<td>Metal</td>
<td>100</td>
</tr>
<tr>
<td>Miscellaneous</td>
<td>50</td>
</tr>
</tbody>
</table>

ACTIVITY 3: Looking Through Line Graphs
Is That Trash You’re Wearing?

In 2006, 13 billion of these containers were recycled but 47 billion were not. What percentage would you estimate the increase to be? What is actually the increase? How can you explain the difference between your estimate and the actual increase?

<table>
<thead>
<tr>
<th>Year</th>
<th>Bottles Recycled</th>
</tr>
</thead>
<tbody>
<tr>
<td>2002</td>
<td>12 billion</td>
</tr>
<tr>
<td>2004</td>
<td>14 billion</td>
</tr>
<tr>
<td>2006</td>
<td>16 billion</td>
</tr>
</tbody>
</table>

---

**Slice the Pie!**

In the bar chart, you may see a red apple right in the middle. This is an example of a misleading pie chart that may make one group look larger than it really is. The trick is that the apple is much larger than you think it is. So, what does that make the rest of the pie look like? The rest of the pie is actually much smaller than you think it is. How can you make a misleading pie chart?

**Work the Math:**

Energy costs $0.15/kilowatt-hour. What are the total energy costs if 1,000 tons of paper are recycled?

**Act it Out:**

Americans are recycling more than ever before, but some items are still thrown away every single day. Here are some reasons why this is a serious problem because they take a long time to decompose. Complete the questions below and see how recycling can reduce plastic bags from the terrestrial equation.

<table>
<thead>
<tr>
<th>Bag Type</th>
<th>Amount Produced (millions)</th>
<th>Amount Recycled (millions)</th>
<th>Amount Landfilled (millions)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plastic</td>
<td>50</td>
<td>25</td>
<td>25</td>
</tr>
<tr>
<td>Paper</td>
<td>10</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Canvas</td>
<td>5</td>
<td>3</td>
<td>2</td>
</tr>
</tbody>
</table>

---

**Raising the Recycling Bar**

<table>
<thead>
<tr>
<th>Type of Material</th>
<th>Waste Created (Millions of Tons)</th>
<th>Billions of Bottles Recycled</th>
</tr>
</thead>
<tbody>
<tr>
<td>Glass</td>
<td>7.2°</td>
<td>13 billion</td>
</tr>
<tr>
<td>Plastic</td>
<td>43.2°</td>
<td>47 billion</td>
</tr>
<tr>
<td>Metal</td>
<td>14.4°</td>
<td>12 billion</td>
</tr>
<tr>
<td>Food</td>
<td>115.2°</td>
<td>32 billion</td>
</tr>
<tr>
<td>Paper</td>
<td>169.2°</td>
<td>47 billion</td>
</tr>
</tbody>
</table>

---

**Draw the Line!**

What you need to do:

a. Make a line graph to show the two points of data for each year.

b. Include scales on the horizontal and vertical axes.

---

**Fun Facts!**

In 1990, 9 million of the billions of Save-A-Bot plastic bags were recycled. How many tons of plastic would this be? 30 tons. It’s a whole lot of plastic, but it is a start in the right direction.

---

**BONUS ACTIVITY 2: Water Conservation**

3,500 cases ÷ 40 cases per ton = 87.5 tons x 17 trees per ton = 1,501.5 trees

---

**Reproducibles Answer Key**

1. a. $17.6 million; b. $7,000,000; c. $380,000; d. $60,000
2. a. 0.36; b. $11,900; c. 17 trees
3. $100,000; 900,000 bottles

---

**Reproducible 1**

**Reproducible 2**

**Reproducible 3**

---

**Photos, top to bottom, left to right:** © Corbis/Veer; © Rubberball; © Steve Cole/Photodisc/Getty Images.
ACTIVITY 1: Peering into Pie Charts

Make a Paper Pie

Millions of trees are used each year to make paper. Study the table below to see how many you can save each year by recycling.

<table>
<thead>
<tr>
<th>Material</th>
<th>Trees Saved per 1,000 Tons of Paper Recycled</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paper</td>
<td>84%</td>
</tr>
<tr>
<td>Yard</td>
<td>19%</td>
</tr>
<tr>
<td>Waste</td>
<td>32%</td>
</tr>
<tr>
<td>Plastics</td>
<td>30%</td>
</tr>
<tr>
<td>Metals</td>
<td>13%</td>
</tr>
<tr>
<td>Glass</td>
<td>20%</td>
</tr>
</tbody>
</table>

1. Work the Math:
   - Calculate the amount of water saved if 1,080 tons of paper are recycled.
   - Calculate the amount of oil saved if 1,240 tons of paper are recycled.
   - Calculate the amount of toxins saved if 960 tons of paper are recycled.

2. Slice the Pie!
   - Where do most of the trees saved go?
   - Which materials are recycled the least?

ACTIVITY 2: Bar Graphs—A Statistical Skyline

Raising the Recycling Bar

In 2006, 13 billion of these containers were recycled but 47 billion were not. What percentage should you reasonably expect to be recycled by 2020, if we act now to change our habits?

<table>
<thead>
<tr>
<th>Year</th>
<th>Millions of Bottles Recycled</th>
</tr>
</thead>
<tbody>
<tr>
<td>1999</td>
<td>7 (6.96)</td>
</tr>
<tr>
<td>2001</td>
<td>9 (9.12)</td>
</tr>
<tr>
<td>2003</td>
<td>10 (9.8)</td>
</tr>
<tr>
<td>2005</td>
<td>12 (12.1)</td>
</tr>
</tbody>
</table>

1. Work the Math:
   - 22 million tons of plastic were recycled. Add 22 million tons to 50 million tons to find the total amount of plastic that was recycled in 2005.
   - 30 million tons of glass were recycled in 2005. 
   - Find the total amount of each type of material that was recycled.
   - Find the total amount of each type of material that was not recycled.
   - Find the total amount of material that was recycled from 1999 to 2005.

2. Line It Up:
   - Create a second graph showing the percentage of waste that was recycled each year.
   - Use a line graph to show the trend. What is the overall trend?

ACTIVITY 3: Looking Through Line Graphs

What Is Trash You’re Wearing?

Recycled materials can be used to create clothing. In 2006, 13 billion of these containers were recycled but 47 billion were not. What percentage of each group should be recycled to make a sleeping bag?

<table>
<thead>
<tr>
<th>Type of Material</th>
<th>Recycled (Millions)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paper</td>
<td>47%</td>
</tr>
<tr>
<td>Yard</td>
<td>20%</td>
</tr>
<tr>
<td>Waste</td>
<td>32%</td>
</tr>
<tr>
<td>Plastics</td>
<td>12%</td>
</tr>
<tr>
<td>Metals</td>
<td>4%</td>
</tr>
<tr>
<td>Glass</td>
<td>3%</td>
</tr>
</tbody>
</table>

1. Work the Math:
   - If 3/4 of all plastic waste created was recycled, how many tons of plastic were recycled in 2006? (Use the table to help you.)
   - If 2/3 of all yard waste created was recycled, how many tons of yard waste were recycled in 2006? (Use the table to help you.)

2. Draw the Line!
   - Create a line graph to show the percentage of recycling for each material that is being recycled. (On separate graph paper, create a second graph showing the percentage of waste that was recycled each year.)
   - Use these numbers to create a line graph in a clockwise direction.
ACTIVITY 1: Peering into Pie Charts
Make a Paper Pie

- Millions of trees are used each year to make paper. Study the table below to see how much paper each tree saves. Then use the pie chart to show the way that recycling adds up.

<table>
<thead>
<tr>
<th>Material Saved by Recycling Paper</th>
<th>Amount Saved per Ton</th>
<th>Energy Costs</th>
<th>Water Saved</th>
<th>Air Pollution Saved</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paper</td>
<td>600 cases</td>
<td>0.15 kw-hr</td>
<td>7,000,000</td>
<td>60,000</td>
</tr>
<tr>
<td>Yard</td>
<td>7,000,000</td>
<td>0.15 kw-hr</td>
<td>7,000,000</td>
<td>60,000</td>
</tr>
<tr>
<td>Waste</td>
<td>380,000</td>
<td>0.15 kw-hr</td>
<td>7,000,000</td>
<td>60,000</td>
</tr>
</tbody>
</table>

Work the Math:
- a. Water saved: $3,600,000 gallons. What is the total water cost savings if 1,000 tons of paper are recycled?
- b. Energy costs: $0.15/kwh. What is the total energy savings if 1,000 tons of paper are recycled?

Make a Pie: Imagine a school that recycles its paper every year. All the numbers in the pie chart are based on the amounts of each type of waste generated by students at the school. Complete the pie chart below. Remember: the percent of students who recycle represents an overall picture of all students in the school, as a class. Complete the pie chart by adding in the percentage of students who recycle in your classroom.

Americans are recycling more than ever before, but some items are still thrown away: easily recyclable bottles and aluminum cans are the items most often recycled. Some people, however, feel that the amount of waste being recycled is not enough. Recycling not only helps the environment, it also helps the economy. For example, in 2006, 13 billion PET bottles were recycled and even made into clothing! Here’s how you can help:

- Recycle: Keep plastic bottles and cans out of the trash. Be sure to put lids and caps on when throwing away cans, and never throw a crushed aluminum can into a fire.
- Reuse: Use cloth bags, plastic bags, and reusable containers for water, food, and beverages.
- Reduce: Use less plastic and aluminum by choosing products that require less packaging.

ACTIVITY 2: Bar Graphs—A Statistical Skyline
Raising the Recycling Bar

- In the table below, the amount of material saved if 1,000 tons of paper were recycled. Add your answers to the pie chart columns.

<table>
<thead>
<tr>
<th>Material Saved by Recycling Paper</th>
<th>Amount Saved per Ton</th>
<th>Energy Costs</th>
<th>Water Saved</th>
<th>Air Pollution Saved</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paper</td>
<td>600 cases</td>
<td>0.15 kw-hr</td>
<td>7,000,000</td>
<td>60,000</td>
</tr>
<tr>
<td>Yard</td>
<td>7,000,000</td>
<td>0.15 kw-hr</td>
<td>7,000,000</td>
<td>60,000</td>
</tr>
<tr>
<td>Waste</td>
<td>380,000</td>
<td>0.15 kw-hr</td>
<td>7,000,000</td>
<td>60,000</td>
</tr>
</tbody>
</table>

Work the Math:
- a. Water saved: $3,600,000 gallons. What is the total water cost savings if 1,000 tons of paper are recycled?
- b. Energy costs: $0.15/kwh. What is the total energy savings if 1,000 tons of paper are recycled?

Make a Pie: Imagine a school that recycles its paper every year. All the numbers in the pie chart are based on the amounts of each type of waste generated by students at the school. Complete the pie chart below. Remember: the percent of students who recycle represents an overall picture of all students in the school, as a class. Complete the pie chart by adding in the percentage of students who recycle in your classroom.

Graph II: The table on the left side shows how much material is recycled at the school. The bar graph to the right shows the amount of each type of waste created. The percentages are not accurate to the nearest whole number.

<table>
<thead>
<tr>
<th>Type of Waste</th>
<th>Amount Created (Millions of Tons)</th>
<th>Recycled (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paper</td>
<td>500</td>
<td>47%</td>
</tr>
<tr>
<td>Yard</td>
<td>100</td>
<td>32%</td>
</tr>
<tr>
<td>Waste</td>
<td>380</td>
<td>7%</td>
</tr>
<tr>
<td>Plastics</td>
<td>400</td>
<td>38%</td>
</tr>
<tr>
<td>Metals</td>
<td>300</td>
<td>63%</td>
</tr>
<tr>
<td>Glass</td>
<td>100</td>
<td>0</td>
</tr>
</tbody>
</table>

Fun Fact!
- In 1999, 7 billion of these containers were recycled but 47 billion were not. What percentage of your waste is recycled? (Round your answer to the nearest whole number.) Write your answer in the blank graph on the right below.

ACTIVITY 3: Looking Through Line Graphs
Is That Trash You’re Wearing?

- In 2006, 6.6 billion of these containers were recycled but 25 billion were not. What percentage of your waste is recycled? (Round your answer to the nearest whole number.) Write your answer in the blank graph on the right below.

Fun Fact!
- In 1999, 7 billion of these containers were recycled but 47 billion were not. What percentage of your waste is recycled? (Round your answer to the nearest whole number.) Write your answer in the blank graph on the right below.

Draw the Line! If the company saves $4 per jacket and $12 per sleeping bag by using recycled bottles, how many jackets would be made and how many sleeping bags would be made if the company saves $4 per jacket and $12 per sleeping bag?
Lesson 3: Looking Through Line Graphs

OBJECTIVES:

Students will understand—

• that line graphs show how two pieces of information are related
• how to propose and justify predictions based on bar graph analysis.

DIRECTIONS:

When students are done, review the answers to the reproducible as a class. Direct students to the “Line It Up” question on the reproducible. Their graph should be a line graph. Once students have finished their graphs, instruct them to move on to the questions on the reproducible.

Reproducibles Answer Key (continued)

4. a. Dark blue (745 gallons) represents the number of students who do not use water. Separate the graph into two bars, one representing the students not using water and the other representing the students using water. Mark the first point on the graph for 1985 and then extend the graph line to connect the points for each year. Students will see that the number of students using water increased from 1985 to 2005.

5. a. 37.6 gallons of oil; 37.6 gallons of oil x $1.50 = $56.40

6. a. This represents the amount of money spent on lunch per day for the years 1985 through 2005. "Lunch" is the independent variable and is graphed on the x-axis, and "Price" is the dependent variable and is graphed on the y-axis.

b. The answer will vary for each student's graph.

7. a. 74% increase

8. Answers will vary.

Science (National Science Education Standards)

Science and Technology in Society

Evidence, models, explanations

Science and technology in society

Evolution of technologies

Unifying Concepts and Processes:

Science

Recognize and apply mathematics in contexts outside of mathematics (3-5, 6-8)

Use graphs to analyze the nature of changes in quantities in linear relationships (6-8)

Science as Inquiry

History and Nature of Science

Science in Personal and Social Perspectives

Math Resource Available from The Actuarial Foundation

Visit www.actuarialfoundation.org/grant/

Learn more about this program at:

www.scholastic.com/businesspiecharts

Free printable copies of this program are available at:

www.scholastic.com/businesspiecharts

www.actuarialfoundation.org/branding.html

The Actuarial Foundation seeks to improve student math education today and enhance student math education in the future. We hope you enjoy this great resource for students, while also showing them the relevance of math in their lives. Developed by The Actuarial Foundation and in the future. We hope you enjoy this great resource for students, while also showing them the relevance of math in their lives. Developed by The Actuarial Foundation and the National Council of Teachers of Mathematics (NCTM), "Lines, Bars, and Pies!" provides a fun and engaging way for students to practice and apply their math skills. For more information visit www.actuarialfoundation.org or www.scholastic.com/businesspiecharts.

Lesson 3: Bar Graphs: A Statistical Skyline

Alignments with National Standards

Grade 4–6

Core Ideas

Recognize and apply mathematics in contexts outside of mathematics (3-5, 6-8)

Use graphs to analyze the nature of changes in quantities in linear relationships (6-8)

Mathematics

Science

Evidence, models, explanations

Evolution of technologies

Unifying Concepts and Processes:

Evidence, models, explanations

Evolution of technologies

Unifying Concepts and Processes:

Science and Technology in Society

NCTM Standards

• Understand the differences between dependent and independent variables
• Understand the different purposes of graphs

Best Practices Guide

Math Academy

Dear Teacher:

"Lines, Bars, and Pies!" is a dynamic math program designed for third graders who are working on mastering mathematics skills. The Actuarial Foundation, along with Scholastic, offers this program to students, teachers, and parents as a way to learn about new math concepts and make math fun! With "Lines, Bars, and Pies!" teachers can help young students learn to analyze bar graphs and line graphs, and to make predictions based on trend analysis. This program is part of a series of math programs developed by The Actuarial Foundation and Scholastic to help students develop their math skills.

Scholastic and The Actuarial Foundation

The Actuarial Foundation has been at the forefront of education for decades. The foundation has developed numerous educational programs and resources for teachers and students of all ages. The "Lines, Bars, and Pies!" program is just one of many resources available from the foundation. To learn more about the foundation, visit www.actuarialfoundation.org.

Get Started

In the following pages, you will find the reproducible and handouts you can use to help teach this program. This reproducible can be used in a variety of ways. In addition to using it as a handout, you can also use it as a fold-out poster. The Actuarial Foundation seeks to provide teachers with resources that can be used in a variety of settings. The "Lines, Bars, and Pies!" program is just one of many resources available from the foundation. To learn more about the foundation, visit www.actuarialfoundation.org.

Mentoring combined with 15 years of math program development experience have created a unique educational program that is designed to make math fun, engaging, and relevant. We hope you enjoy "Lines, Bars, and Pies!" and that it helps you and your students learn about new math concepts. For more information on this program or other math programs available from The Actuarial Foundation, visit www.actuarialfoundation.org.

The Actuarial Foundation staff

www.actuarialfoundation.org