

Income Levels and Social Class
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Suggested Grade Levels: 5th – 8th grades

Suggested Subject Area: Mathematics

Learning Objectives:

Students will have the opportunity to:

- Apply understanding of graphing and graph interpretation.
- Apply understanding of percentages and their calculation.
- Set up a spreadsheet and do calculations using columns.
- Reason from data.

Standards List:

This activity addresses the following national content standards as outlined by the National Council of Teachers of Mathematics, accessible at http://standards-e.nctm.org/1.0/89ces/Table_of_Contents.html :

Standard 1: Mathematics as Problem Solving

In grades 5-8, the mathematics curriculum should include numerous and varied experiences with problem solving as a method of inquiry and application so that students can formulate problems from situations within and outside mathematics; verify and interpret results with respect to the original problem situation; generalize solutions and strategies to new problem situations.

Standard 2: Mathematics as Communication

In grades 5-8, the study of mathematics should include opportunities to communicate so that students can model situations using oral, written, concrete, pictorial, graphical, and algebraic methods; reflect on and clarify their own thinking about mathematical ideas and situation; use the skills of reading, listening, and viewing to interpret and evaluate mathematical ideas; discuss mathematical ideas and make conjectures and convincing arguments.

Standard 3: Mathematics as Reasoning

In grades 5-8, reasoning shall permeate the mathematics curriculum so that students can recognize and apply deductive and inductive reasoning; appreciate the pervasive use and power of reasoning as a part of mathematics; validate their own thinking.

Standard 4: Mathematical Connections:

In grades 5-8, the mathematical curriculum should include the investigation of mathematical connections so that students can ; explore problems and describe results using graphical, numerical, physical, algebraic, and verbal mathematical models or representations; apply mathematical thinking and modeling to solve problems that arise in other disciplines, such as art, music, psychology, science, and business; value the role of mathematics in our culture and society.

Standard 5: Number and Number Relationships

In grades 5-8, the mathematics curriculum should include the continued development of number and number relationships so that the students can represent numerical relationships in one- and two-dimensional graphs.

Standard 6: Number Systems and Number Theory

In grades 5-8, the mathematics curriculum should include the study of number systems and number theory so that students can understand and appreciate the need for numbers beyond the whole numbers; develop and use order relations for whole numbers, fractions, decimals, integers, and rational numbers; extend their understanding of whole number operations to fractions, decimals, integers, and rational numbers; understand how the basic arithmetic operations are related to one another; develop and apply number theory concepts (e.g., primes, factors, and multiples) in real-world and mathematical problem situations.

Standard 7: Computation and Estimation

In grades 5-8, the mathematics curriculum should develop the concepts underlying computation and estimation in various contexts so that students can develop, analyze, and explain procedures for computation and techniques for estimation; use computation, estimation, and proportions to solve problems; use estimation to check the reasonableness of results.

Standard 8: Patterns and Functions

In grades 5-8, the mathematics curriculum should include explorations of patterns and functions so that students can describe and represent relationships with tables, graphs, and rules.

Standard 10: Statistics

In grades 5-8, the mathematics curriculum should include exploration of statistics in real-world situations so that students can systematically collect, organize, and describe data; construct, read, and interpret tables, charts, and graphs; make inferences and convincing arguments that are based on data analysis; evaluate arguments that are based on data analysis.

Tools and Materials:

- Computers with Internet access
- Computers with spreadsheet software or calculator and graph paper
- "Mean Income Received by Each Fifth and Top 5% of Families" handout, available at http://epinet.org/datazone/famyfifth_mean.html
- Group Worksheet (available as a download from this site)

Time Needed:

It is suggested that one to two 45 minute class periods be used for the lesson.

Strategy:

1. Have students log onto the Class in America web site at <http://www.pbs.org/classinamerica/index.html> Students should click on "STORIES" and read each story.

2. After they read the stories, encourage the students to discuss what the income levels of each character might be. How would their income levels affect their lifestyles? Here are some questions to generate class discussion on social class and income levels:

- Describe the lifestyles and living standards of the 20% of the population with the highest income level in this country. Now describe the stories and living standards for the 20% of the population that has the middle income level.
- Is it possible for people of different income levels to be part of the same social class?
- If two families have the same income but make very different choices about how to spend their money (such as how much to spend on housing, travel and entertainment, vs. how much to spend on education, etc.) would they be in the same social class?
- Do you think that in other countries the 20% of the population with the highest income level has the same lifestyle as the highest social class in America? Do the poorest 20% around the world have similar living standards?
- Do you think the same number of people are in each social class in each country? In America, does each social class described in the stories include the same number of people?
- Are social classes distinct or do you think there are people who live on the border between classes? What do you think it would be like to live straddling two classes?

3. Pass out the sheet "Mean Income Received by Each Fifth and Top 5% of Families" or have the students log on to the web site http://epinet.org/datazone/famyfifth_mean.html to access it.

Here are some questions to encourage discussion: What do the "lowest fifth", "second fifth" and "highest fifth" refer to? What class would we label the lowest fifth? Second fifth? Third fifth? How would you classify the people in the stories?

4. This is a good opportunity to pick up the pace of the lesson, with quicker questions that involve a lot of students. Some of these questions might include: Give a fraction equivalent to $\frac{1}{5}$? Another? How do you know they are equivalent fractions? What is $\frac{1}{5}$ equal to as a decimal? As a percentage? How do you change fractions into decimals? How do you change decimals into fractions? How would you write $\frac{2}{5}$, $\frac{3}{5}$, $\frac{4}{5}$ and $\frac{5}{5}$ as decimals? As a challenge, how about writing $\frac{20}{80}$ as a decimal? Can you do any of these quickly or in your head? What makes them so easy?

5. Divide the class into cooperative groups and pass out Group Worksheet (available as a download from this site). Have the students work on it in groups.

6. Bring the class back together and lead the discussion as the students compare their results. Try to generate discussion on the cost of living and how it varies across years and regions. You might pose the following questions: Why were all of the numbers on the sheet "Mean Income Received by Each Fifth and Top 5% of Families" reported in 1997 dollars? Is \$30,000 always worth the same amount? Does a car cost the same today as 10 years ago? A house? A gallon of milk? Are prices the same across the country?

7. Go to the web site <http://newsengin.com>. Look under Free Tools and the Cost of Living Calculator. There are sections titled "Background: How the Cost of Living Calculator Works" and "Details: How The Government Measures Changes in Consumer Prices." These are good background sections. They include the formula that the calculator uses to find the change in

prices. Read these before class. There are two calculators. One includes all items and the other includes all items less food and energy. You can also choose whether to look at a U.S. average or a particular city.

8. Let the students play with the calculators in small groups.

9. Once they have the chance to play with it, explain the background and how the CPI calculator works. You might pose the following questions: Why are there different calculators for different cities? Have the students graph how much \$100 in 1950 (or choose another year) in different cities would have as buying power in 1999. Lead a discussion on why the same \$100 is worth different amounts in different cities in 1999.

Assessment Recommendation:

1. Students can be evaluated on the accuracy of their responses in the group discussion and on their level of participation in the class discussion.
2. Students can be evaluated on the accuracy of their responses on the Group Worksheet.

Extensions:

Comparison of different regions and states:

1. Log on to <http://epinet.org>
2. Go to the section titled State & Regional Data. Under Family Earnings and Income Trends there are tables titled "Income Inequality by State" and "Median Income for Four-Person Families".
3. Assign each student or group a different region and have them answer questions about their region:
 - For income inequality: What does the 6.7 for Maine in 1978-80 mean? Are trends getting better or worse in Maine when it goes to 7.7 in 1988-90?
 - Ask the students to think about why the income gap is shrinking or growing in their state. What factors could be contributing to the change?
 - For median income: Have the students explain the difference between median and mean, which was used in the activity sheet. Graph the median incomes by state for 1996. What are some factors that would cause certain states to have high median incomes? Very low median incomes? Is the cost of living the same across the country?

Budgeting extension activity:

1. Divide the class into groups.
2. Assign each group a different size family. For example, one group could represent a family with two parents and two children, another could represent a single parent and child or a single person. Have each group prepare a monthly budget for their family based on a monthly income of \$3,714 dollars (\$44,568 annually). Each family has the same income level (although it is also possible to assign groups different income levels in addition to different family sizes). Specify which city the students should use as the hometown.
3. Have all the students brainstorm as a group to think up a list of categories that should be included in a budget. Make sure their list includes at least these categories:
 - *Housing* - How big a house or apartment? Is it near a good school? Any amenities with the apartment?

- *Utilities* - phone basic service or include call waiting and caller ID? Gas, electricity.....
 - *Car* - what kind of car? Insurance, gas, maintenance.....
 - *Clothes*
 - *Food* - groceries and restaurants
 - *Entertainment* - travel, movies.....
4. Have the students use sources such as the web and newspapers to find realistic prices.
 5. Afterwards have each group present their budget to the class. The presentation should include a pie chart to show how the monthly income is split between to budget categories.
 6. Discuss how the budget choices change depending on the size of the family and income level. Compare the pie charts for the groups. Is the split between categories similar for each group? For each income level? Students might also work with spreadsheets when building their budgets.