



What Will You Net? Determining Your Take-Home Pay

The Bottom Line

What is the relationship between gross pay and take-home pay?

Students examine Aaron Ausum's pay stub to see what is being deducted from his gross pay in order to determine his net pay. Students then consider a career they might choose, a likely income for that career, and what they might expect to receive in net pay.

Standards Met in This Chapter

CCSSM Standards and Practices

6.RP.3c: Find a percent of a quantity as a rate per 100 (e.g., 30% of a quantity means 30/100 times the quantity); solve problems involving finding the whole, given a part and the percent.

6.NS.3: Fluently add, subtract, multiply, and divide multi-digit decimals using the standard algorithm for each operation. [*Note:* In this lesson, this standard is met if students do calculations by hand, rather than by using technology.]

MP.2: Reason abstractly and quantitatively.

MP.3: Construct viable arguments and critique the reasoning of others.

(National Governors Association Center for Best Practices and Council of Chief State School Officers [NGA Center and CCSSO] 2010)

Jump\$tart Standards

Employment and Income: Use a career plan to develop personal income potential.

Standard 1: Explore job and career options.

Standard 3: Analyze factors that affect net income.
(Jump\$Start Coalition for Personal Financial Literacy 2015)

Balance Sheet

According to the Bureau of Labor Statistics (2012), the average annual mean income in the United States in 2011 was approximately \$45,000 a year. After taxes and deductions, Americans, on average, make significantly less. It is important for students to understand that if they pick a career with an average salary of \$30,000 a year, they won't really take home \$30,000 a year.

This activity explores the effects of paycheck deductions (gross vs. net pay) and then guides students to consider different career paths based on what they have learned about the effects of taxes and the other deductions that are imposed on their gross pay. They will explore different career choices while considering sample average annual salaries and the take-home pay of those salaries, while also taking the cost of education or training into consideration. As an extension (in the Growth Opportunities section), students can consider the short- and long-term costs and benefits of going to college as well as calculate the lifetime earnings for different careers.

The following sections describe the mathematical and financial literacy concepts that this lesson will encompass, as well as the knowledge and experiences that middle school students may bring to the lesson and take from it upon its completion.

Mathematics

This lesson focuses on finding a percent of a quantity as a rate per 100 (6.RP.3c; NGA Center and CCSSO 2010) and computation with decimals (6.NS.3). Standard 6.RP.3c is used when students discover the effects that different taxes have on a person's salary, as they analyze take-home pay as a percent of gross pay. Students examine the tax rates of different taxes (federal, state, local, Social Security, etc.) as a rate per 100, and they solve problems that involve finding the whole, given a part and the percent. While setting up a proportion is one way to model these problems, understanding can be enhanced with the use of visuals and other representations. For example, to help students visualize the relationship between a part and a whole as they work through this lesson, teachers might use Cuisenaire rods, draw bar or strip diagrams, use ratio tables, or set up proportional equations. Additionally, students will need to fluently compute with multi-digit decimals to add, subtract, multiply, and divide different taxes in order to see the overall effect of multiple deductions from their hypothetical future paycheck (if students are required to do calculations by hand). Students will reason about the quantities (MP.2; NGA Center and CCSSO 2010) as they relate gross pay to net pay (and vice versa). Students will also justify their reasoning as they tell how they estimated the percent of gross pay that is net pay (MP.3).

Financial Literacy

Several of Jump\$Start's financial literacy standards related to Employment and Income are embedded in this activity. Working backward, students first learn about the effects of different taxes on a person's take-home pay. Students take a closer look at take-home pay in the context of specific salaries and consider what annual gross salary they will need to have a desired amount (x) of take-home pay. Next, students explore career options and are provided with the average annual (gross) salary for these careers. Looking at different careers and their take-home pay can help students better understand what career goals they need to set in order to live a financially comfortable lifestyle.

Did you know?

In 2000, about 20 percent of all jobs in America were manufacturing jobs. By 2012 the fraction was only about 5 percent (Snyder 2012).

This activity has a strong focus on gross pay versus net pay. Gross pay is a person's pay before taxes and other deductions are taken. Taxes deducted usually include federal, state, and local (or city) taxes, Social Security tax, and Medicaid. Other deductions may be made for health, dental, and vision insurance; short- and long-term disability insurance; life insurance; retirement account contributions; and other benefits. Both taxes and deductions vary greatly from state to state, city to city, and among different employers and their benefit options. There are no set formulas or guidelines that would work for all situations. However, information about the tax rates of individual states and localities can often be found online at state and local government websites.

Student Knowledge and Experience

While middle-grades students may have ideas about what careers interest them, they likely do not know much about the salaries of these careers. Likewise, students may not realize that workers do not actually get to keep their entire gross salary and that, instead, they receive a percentage of their salary as their take-home pay after taxes are deducted. Therefore, students may think that earning a salary such as \$20,000 a year will allow them to live comfortably, because they do not realize the effects of taxes or the living expenses that adults incur. Having knowledge of potential salaries of chosen careers and the real effects of taxes and other deductions imposed on gross earnings can help students to begin thinking early about the paths they want to take with regard to high school course tracks, college or training preparation, and more. This is the type of information that students from some backgrounds may not have access to at home. Helping students become more financially literate about income and careers can help all students make informed decisions about career choices and budgeting.

Lesson Plan

Learning Target

Discover the relationship between gross and net pay, and connect pay to the choices made among career, education, and training options.

Resources and Tools

Activity Sheet 1.1: Aaron Ausum's Pay: From Gross to Net

Exit Slip 1.1: What Are Your "Take-Home" Insights?

(Available for download and printing at <http://www.nctm.org/more4U>)

Key Language

gross pay: The amount of pay you make before any deductions are taken.

net pay (or take-home pay): The amount of pay you make after deductions are taken. This is the amount you actually receive, or get to "take home."

salary: Compensation for work, expressed as an annual sum and paid in prorated portions regularly—usually weekly, biweekly, or monthly.

Sales Pitch

Ask students to make estimates on the following questions and write them on two different sticky notes (to post and sort):

- How much spending money do you think you might need in a month?
- If you need \$1,200 a month to cover rent, food, phone, and so on, what kind of yearly salary do you need in order to have this much spending money?

Sort each set of sticky notes and ask students to make observations. Summarize by explaining that the career they choose is one factor that relates to how much money they will earn. Ask, “How many of you have a particular career in mind?” [*Take thumbs-up/down poll*] and “How many of you know the approximate salary of the career you have in mind?” [*Take thumbs-up/down poll*]. Explain to the class that by the end of the day they will consider how career choice relates to both gross and net income and education level.

Opening

Begin with a whole-class discussion on what gross pay and net pay (or take-home pay) mean. Ask students what a tax is and how many different types of taxes they can name. (They likely are not aware of the many different deductions taken from one’s pay.) Show the sample pay stub, and discuss what each part means (fig. 1.1). (This pay stub also appears in Activity Sheet 1.1: Aaron Ausum’s Pay: From Gross to Net.) Discuss with students the types of common tax deductions: federal, state, local, Social Security, Medicare. Explain that there can be different tax rates on some of these types of taxes based on your income, the state and city you live in, and other factors. Also mention that some adults choose to have additional nontax expenses deducted from their paychecks, such as health insurance, life insurance, retirement savings, and more. Explain that they are about to explore the relationship between gross and net (take-home) pay.

Aaron Ausum

Gross Monthly Earnings	Deductions	Deduction Amount
\$4,000	Federal Tax: 12%	
	State Tax: 3%	
	Local Tax: 1%	
	Social Security Tax: 6%	
	Medicare Tax: 6%	
NET PAY		

Fig. 1.1. Aaron Ausum’s pay stub

Standards for Mathematical Practice:

Students use MP.2 as they complete the activity sheet and think quantitatively about the questions in the scenario.

Standards for Mathematical Practice:

Students use MP.3 as they describe how they estimated the percent of Aaron's gross pay and critique other groups' strategies.

The Fine Print

Part 1: The Relationship between Gross and Net Pay

Provide students with Activity Sheet 1.1 as an introduction to income deductions. As a whole class, review Aaron Ausum's pay stub. Discuss what is meant by "deduction amounts." Ask students to estimate how much money they think Aaron will take home, based on what they see on this pay stub.

Place students in small groups to work on questions 1 and 2 on the activity sheet. After students have finished, discuss the responses as a whole class, in particular the responses to question 2, and ask students to explain how they determined the relationship between gross and net pay. Ask students questions about the situation, such as the following:

- What did you notice about the taxes that are deducted from a person's paycheck?
- Was the total amount Aaron paid in taxes each year more or less than you would have guessed? Why?
- If every adult must pay taxes, billions of dollars are collected each year. What do you think this money is used for locally, by states, and by the federal government?

Read together Aaron's new situation at the beginning of question 3. Ask students to return to their groups and to complete the activity sheet. After they have completed the task, reconvene students for whole-class discussion:

- What percent of Aaron's gross pay does he get to take home (his net pay)?

Answers may vary to this response. Invite students to share their answer and how they reasoned to establish that percentage. Ask students to consider the strategies they hear and determine if that percent and the way of estimating that percent are reasonable. Summarize this part by asking the lesson's essential question:

- What is the relationship between gross pay and take-home pay?

Part 2: Connecting to Your Own Career Choice

Ask students to select a career they think they might want to do in their future. (This can be day 2 of this lesson, repeating similar mathematics as part 1, but for the students' own career choices.) Help students find an estimated starting salary for their career choice. If students don't already know the average salary for their top career choice, they can use the "annual mean wage" national data supplied by the Bureau of Labor Statistics: http://www.bls.gov/oes/current/oes_nat.htm#17-0000 (2014). Have students write down the average salary for their top career choice. Once each student knows this figure, ask the following questions:

- Knowing that some of your pay will go towards taxes, what do you consider a reasonable gross annual salary you hope to make someday? Write this amount down on a sheet of paper. [*Give students time to write down a salary.*]
- Given the salary you have written, calculate your net pay if you had the following tax rates:
 - Federal: 15%
 - State: 4%
 - Local: 1%
 - Social Security: 6%
 - Medicare: 2%

What is your annual net pay based on the gross salary you wrote down?

Standards for Mathematical Practice: Students use MP.2 as they consider which strategies to use in different situations.

- Given the same overall tax rate (28%), how much would your gross annual salary need to be in order for you to have a take-home pay of about \$45,000 a year?
- Given a different overall tax rate of 31%, how much would your gross annual salary need to be in order for you to have a take-home pay of about \$45,000 a year?
- What effect did changing the tax rate by 3% have on the amount of money you would need to make (based on the previous two questions)?

Now, have students look back at the questions they just answered as well as the questions from Aaron Ausum’s situation. Ask students the following questions:

- What mathematical operation would be the best one to use to find the amount of a tax, given a percent and gross pay?
- What mathematical operation did you use to find the total amount of deductions of all the different taxes combined? Explain why you used this operation.
- What mathematical operation did you use to find the net pay, given the gross pay and dollar amount of all the different taxes combined? Explain mathematically why you used this operation.
- What mathematical operation did you use to find the gross pay, given the net pay and overall tax rate? Why is it best to use this operation?

Closing the Deal

Based on what students discovered during the two parts of this lesson, ask students the following questions:

- What is a good way to “ballpark” your take-home pay if you know your gross pay?
- If you know what take-home pay you need, what is a good way to estimate what your gross pay needs to be?
- Knowing what you know now, will you consider other career options? Explain.

As a formative assessment and summary, ask students to complete Exit Slip 1.1: What Are Your “Take-Home” Insights?

Growth Opportunities

1. Encourage students to continue to research (at home, in the computer lab, or perhaps using data that you provide about the local job market) different career options. One source (as used in part 2 of the lesson) could be the “annual mean wage” national data supplied by the Bureau of Labor Statistics: http://www.bls.gov/oes/current/oes_nat.htm#17-0000 (2014). Have students consider the connection between education and potential salary. While there are many exceptions to the rule, on average those with more years of education earn more. Have students explore their top two career choices and determine how much education after high school (if any) is required for each. Students might also search for the cost of obtaining the education or training they need.
2. Discuss with students the short- and long-term costs and benefits of going to college after high school, rather than moving straight into the workforce.
3. Have students calculate their lifetime earnings based on the career they choose and the number of years they plan to work. We suggest that students compare two different careers with substantially different average salaries.

References and Resources

- Bureau of Labor Statistics, U.S. Department of Labor. "May 2014 National Occupational Employment and Wage Estimates: United States." (2014). http://www.bls.gov/oes/current/oes_nat.htm#17-0000.
- Jump\$tart Coalition for Personal Financial Literacy. *National Standards in K–12 Personal Finance Education*. 4th ed. Washington, D.C.: Jump\$tart Coalition for Personal Financial Literacy, 2015.
- National Governors Association Center for Best Practices and Council of Chief State School Officers (NGA Center and CCSSO). *Common Core State Standards for Mathematics*. Washington, D.C.: NGA Center and CCSSO, 2010.
- Snyder, Michael. "55 Interesting Facts about the U.S. Economy in 2012." *The Economic Collapse* (2012). <http://theeconomiccollapseblog.com/archives/55-interesting-facts-about-the-u-s-economy-in-2012>.