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Financial Literacy Week: Where Did All My Money Go?

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Texas Instruments

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Agenda

- Welcome & Introductions
- What's all the fuss?
- Middle grades / Algebra connections with taxes
- Income tax brackets
- Webinar drawing(s)

Expected Outcomes

I CAN help students experience important financial topics such as taxes.

I CAN encourage students to improve discourse of financial concepts.

I CAN become more aware of the resources where I can access premade activities to use with my students.

Special Shout Out to NGPF!

We met Christian Sherrill, Director of Growth & Advocacy at NGPF, at our session in Ft. Worth at T³™IC 2023 and look forward to working more with him and others to combine NGPF curriculum and TI technology!

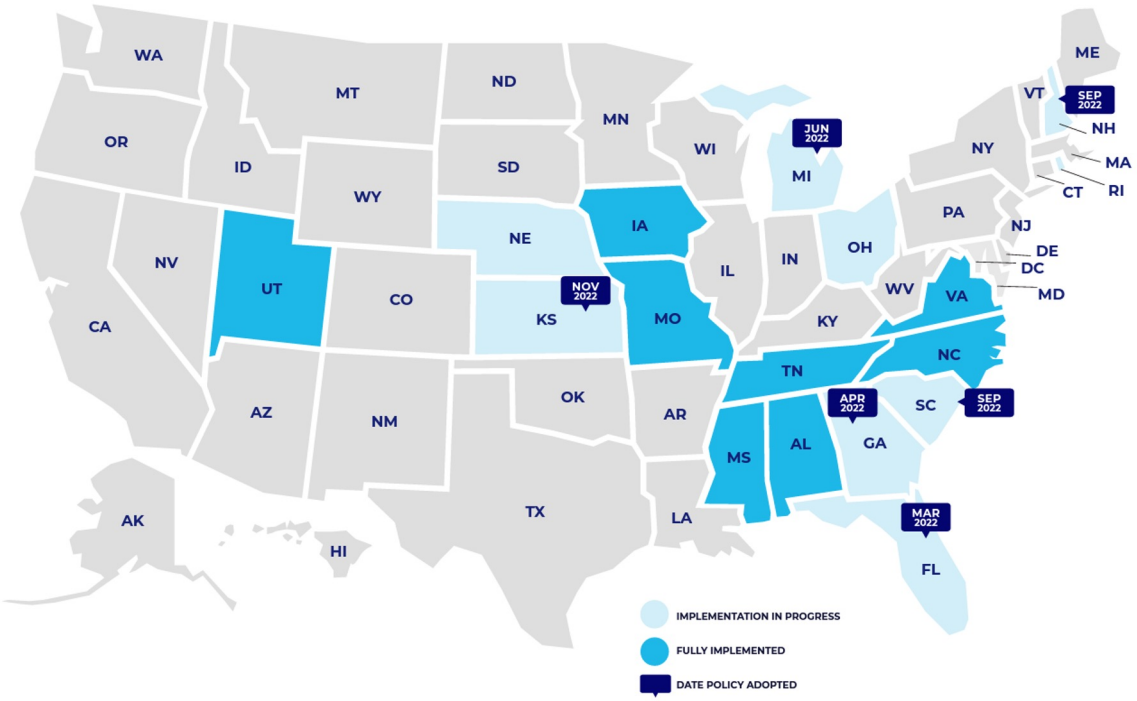
Financial Literacy Importance

- How did we get here?
- What are the current trends in financial literacy education?
- Next Gen Personal Finance's 2023 State of Financial Education Report
    - 17 states!

(As of March 27th, there are now 18! WV has been added)

17 states guarantee a Personal Finance course for all public high school students.

In 2022, 6 more states (FL, GA, KS, MI, NH, SC) added Personal Finance graduation requirements.
Now, 40.5% of U.S. public high school students will be guaranteed to take a Personal Finance course.



NGPF's 2023 State of Financial Education Report 2

NGPF's *2023 State of Financial Education Report* found here: https://www.ngpf.org/state-of-financial-education-report/

How do we start?

- What types of tax would your students be familiar with?
  - Type your answer in chat, but DO NOT submit your answer until prompted.

- Daddy tax
- Sales tax
- Gas tax
- Retirement
  - My parents v my in-laws

Your tax dollar in action!

- In general, why does the US government collect taxes?
- Opinion: do you think the average American household would be better off or worse off if they got to keep all of their income rather than pay taxes? Why?

  - 7 out of 20 students in this class had income tax withheld from their paychecks. Express this as a fraction, decimal and percent.

Activity inspired from NGPF's *Financial Algebra: Fraction and Tax Dollars*
https://docs.google.com/document/d/1jroAR5fgirMZlNfJoXaacFnjVm5UY0r1sifGwAQaRHk/edit

Federal Income Tax

1. **In 2022, 40% of taxpayers owed no federal income taxes or received tax credits back from the government.**
   a. Is 40% a rational number? Why or why not?

   b. What is an equivalent fraction that also represents 40%?

2. **Also during 2022, 16.5% of households paid no federal income taxes AND no payroll taxes. Payroll taxes are specific taxes that contribute toward paying into the funds for Social Security and Medicare.**
   a. What is one way you could write the percent as a fraction instead?

3. **Which number is larger – the portion of Americans who paid no federal income tax or the portion of Americans who paid no federal income tax and no payroll taxes?**

Activity inspired from NGPF's *Financial Algebra: Fraction and Tax Dollars*
https://docs.google.com/document/d/1jroAR5fgirMZlNfJoXaacFnjVm5UY0r1sifGwAQaRHk/edit

Quick Poll Questions

- Reminder: Type your answer in chat, but DO NOT submit your answer until prompted.
- In 2021, approximately what percent of federal tax dollar revenue went to healthcare?
- In 2021, what was the second highest category?
- Do you think that these two categories are typically number 1 and 2?
- In 2021, approximately what percent of federal tax dollar revenue went to education?

* Information from NGPF's activity *Move: Your Tax Dollars in Action* found here: https://docs.google.com/document/d/1jbWinG8OzhbeW0WVBojH30NOIJXAs8ZB8xHtNnw2Pmc/edit

2022 Tax Brackets – What questions do you have about this chart?

Tax Rate	For Single Filers	For Married Individuals Filing Joint Returns
10%	$0 to $10,275	$0 to $20,550
12%	$10,275 to $41,775	$20,550 to $83,550
22%	$41,775 to $89,075	$83,550 to $178,150
24%	$89,075 to $170,050	$178,150 to $340,100
32%	$170,050 to $215,950	$340,100 to $431,900
35%	$215,950 to $539,900	$431,900 to $647,850
37%	$539,900 or more	$647,850 or more

Source: Internal Revenue Service

Activity adapted from NGPF's *Math: Income Tax Bracket Activity* found here:
https://docs.google.com/document/d/190ndqsq5N51tvoHI2nG_XqJIpmQuVQ0tlSF1KfuU4qc/edit

When talking about taxes, it's important to keep in mind the difference between marginal tax rate and effective tax rate.

- **Marginal tax rate:** The highest tax bracket that your taxable income falls in.
- **Effective tax rate:** The actual percentage of your taxable income that you end up paying in taxes.

Aiden has a gross income of $63,000 and takes the standard deduction. Their total taxes due are $6,628.

1. What is their taxable income? (The standard deduction in 2022, was $12,950).
2. What is their marginal tax rate?
3. What is their effective tax rate? Round to the nearest hundredth of a percent.

Aiden has a gross income of $63,000 and takes the standard deduction. Their total taxes due are $6,628.

The **effective tax rate** = total taxes due divided by Aiden's taxable income.

= 13.24% ($6,628/$50,050 x 100)

Now…what does this mean? Where did they get the $6,628?

Aiden's Taxable Income: **$50,050**

Tax Rate	For Single Filers	For Married Individuals Filing Joint Returns	For Heads of Households
10%	$0 to $10,275	$0 to $20,550	$0 to $14,650

Tax Rate of 10%: $10,275 · 0.10 = $1,027.50

$50,050 - $10,275 = $39,775

$39,775 still left to tax in the next tax bracket.

$39,775 still left to tax

12%	$10,275 to $41,775	$20,550 to $83,550	$14,650 to $55,900

Tax Rate of 12%: **This may be surprising!** You need to subtract the range at 12% to get what amount should be taxed at 12%.
$41,775 - $10,275 = $31,500
$31,500 · 0.12 = $3,780
$39,775 - $31,500 = $8,275
$8,275 must then be taxed in the next bracket of 22%.

$8,275 must then be taxed in the next bracket of 22%.

22%	$41,775 to $89,075	$83,550 to $178,150

$8,275 · 0.22 = $1,820.50

Total Tax: $1,027.50 + $3,780 + $1,820.50 = **$6,628**

Summary:

<u>Tax Rate of 10%:</u>

$10,275 · 0.10 = $1,027.50

$50,050 - $10,275 = $39,775

$39,775 still left to tax in the next tax bracket.

<u>Tax Rate of 12%:</u>

$41,775 - $10,275 = $31,500

$31,500 · 0.12 = $3,780

$39,775 - $31,500 = $8,275

$8,275 must then be taxed in the next bracket of 22%.

<u>Tax Rate of 22%:</u>

$8,275 · 0.22 = $1,820.50

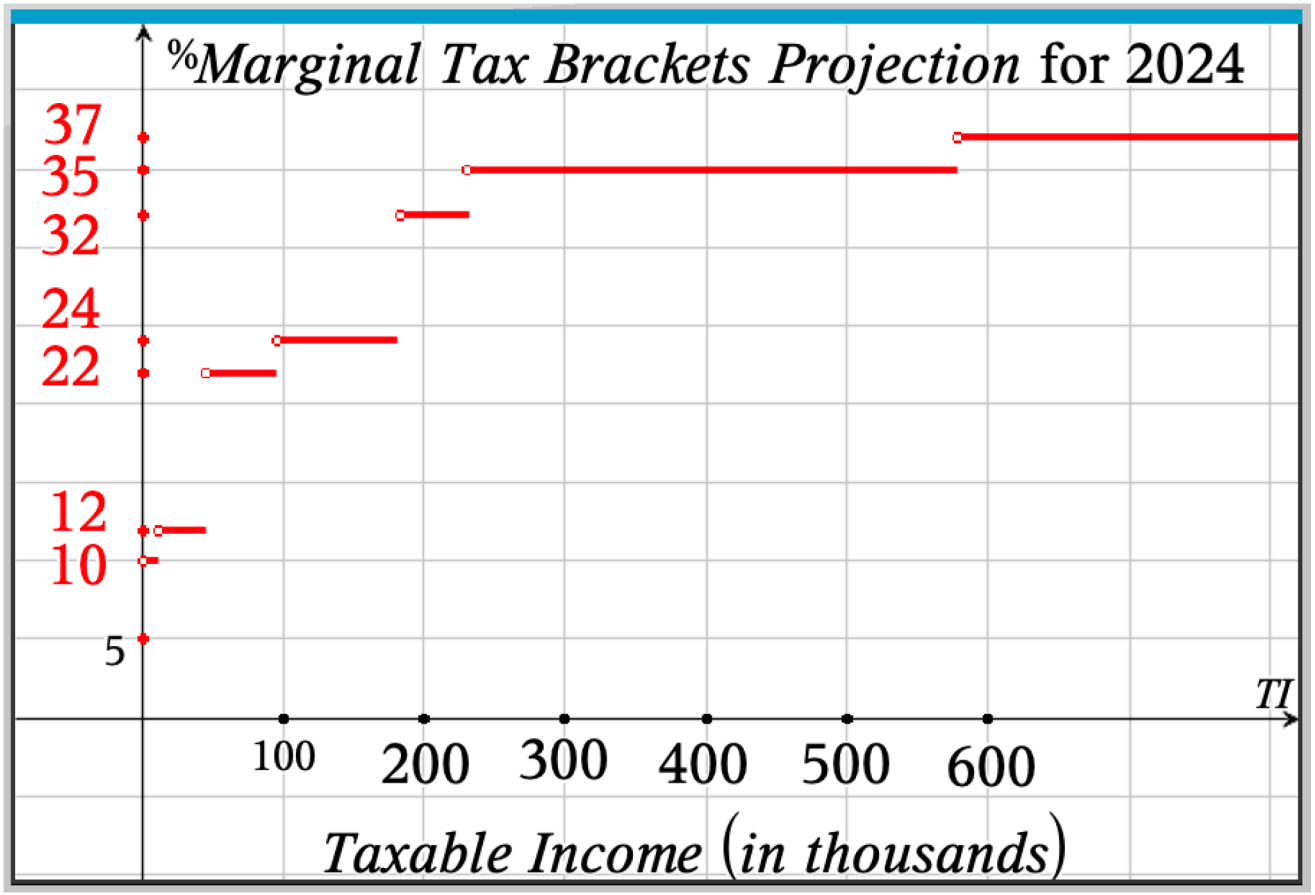
Total Tax: $1,027.50 + $3,780 + $1,820.50 = **$6,628**

Now Let's Visualize the Tax Brackets Using a Piecewise Function Graph

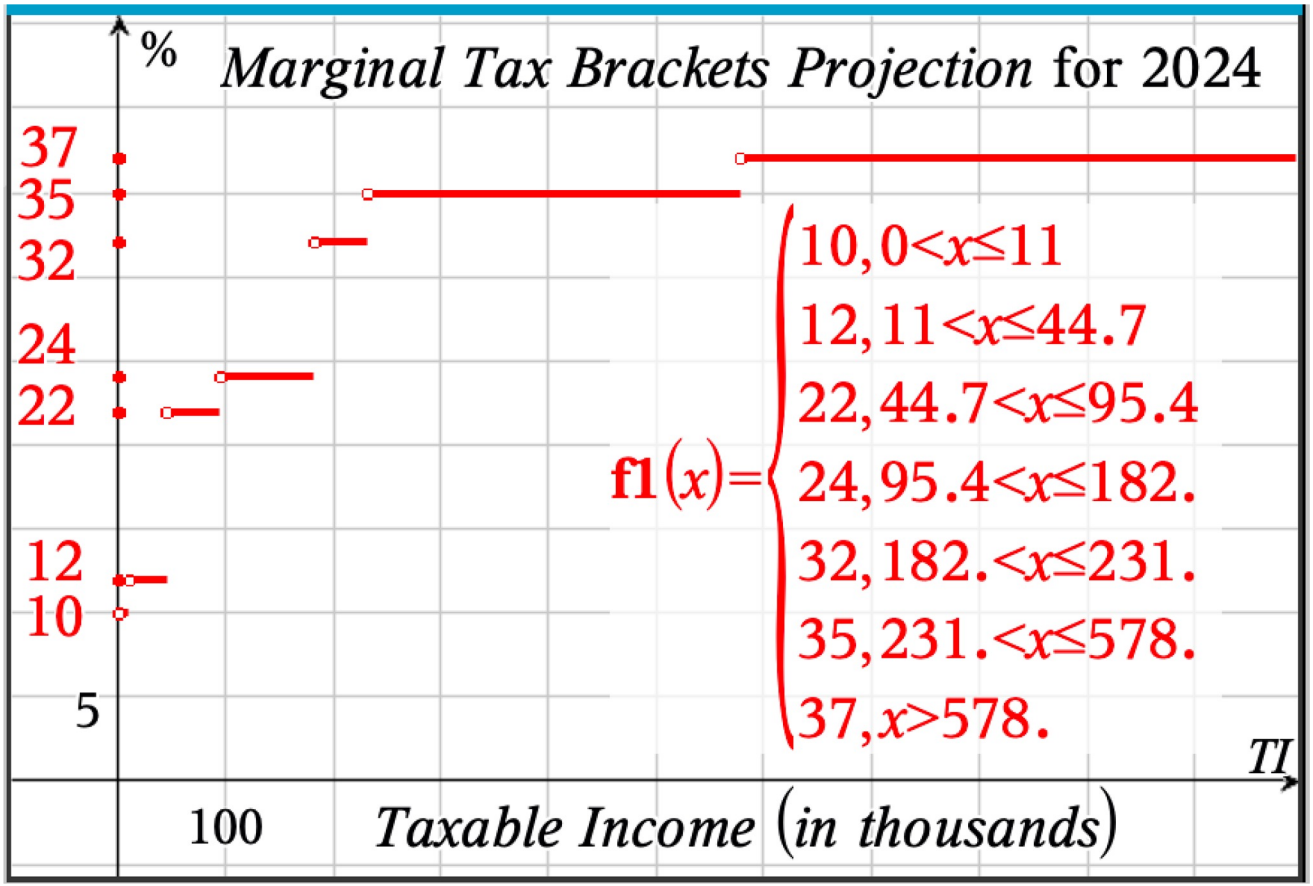
- We could create a Piecewise Graph that represents the proposed Marginal Tax Rate for a single individual in 2024.

- 10% for incomes $11,000 or less
- 12% for incomes over $11,000
- 22% for incomes over $44,725
- 24% for incomes over $95,375
- 32% for incomes over $182,100
- 35% for incomes over $231,250
- 37% for incomes over $578,125

Activity Adapted from NGPF's *APPLICATION: Income and Payroll Taxes as Piecewise Functions* found here: https://www.ngpf.org/math/financial-algebra/



- **What is f(50000)? What does it represent in this context?**



- **Sam's taxable income is $110,000. After looking at the tax brackets, they say: "Oh no- I'm in the 24% tax bracket? So that means I'll have to pay 24% of my income in taxes?! That's $26,400!" Is Sam correct? Why or why not?**

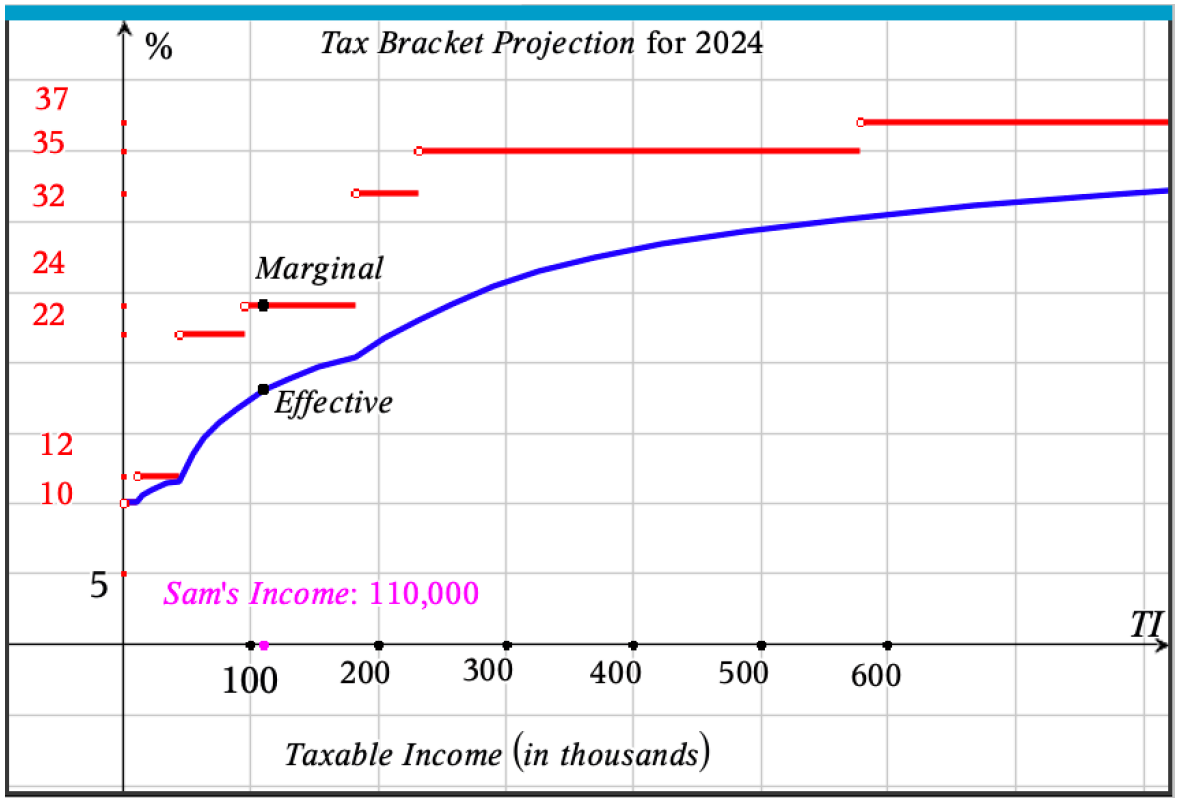
The **effective tax rate** = total taxes due divided by the taxable income

Sam ended up paying $19,800 in total income taxes on their $110,000 in taxable income. What is their effective tax rate? Be sure to convert it from a decimal to a percent.

Why is their effective tax rate different from their marginal tax rate?

Create a graph that shows both the marginal tax rate and effective tax rate as a function of taxable income.

The marginal tax rate and effective tax rate as a function of taxable income.



- Mark a point on the graph representing Sam's marginal tax rate.
- Mark a point on the graph representing Sam's effective tax rate.
- Which function is continuous?
- Which function is discontinuous?

Piecewise Function for Effective Tax Rate

$$f2(x):=\begin{cases} \dfrac{0.1\cdot x}{x}\cdot 100, & 0<x\le 11 \\ \dfrac{1.1+0.12\cdot(x-11.)}{x}\cdot 100, & 11<x\le 44.725 \\ \dfrac{5.147+0.22\cdot(x-44.725)}{x}\cdot 100, & 44.725<x\le 95.375 \\ \dfrac{16.29+0.24\cdot(x-95.375)}{x}\cdot 100, & 95.375<x\le 182.01 \\ \dfrac{37.104+0.32\cdot(x-182.1)}{x}\cdot 100, & 182.01<x\le 231.25 \\ \dfrac{52.832+0.35\cdot(x-231.25)}{x}\cdot 100, & 231.25<x\le 578.125 \\ \dfrac{174.238+0.37\cdot(x-578.125)}{x}\cdot 100, & x>578.125 \end{cases}$$

Complete the Table.

Domain (Tax Bracket)	Marginal Tax Rate	Equation for Total Taxes Paid	Equation for Effective Tax Rate
0 < x ≤ 11,000	10%	**0.10x**	$\frac{0.10x}{x}$
11,000 < x ≤ 44,725	12%	0.12(x - 11,000) + 0.10(11,000)= **0.12(x - 10,275) + 1,100**	$\frac{0.12\,(x-11,000)+1,100}{x}$
44,725 < x ≤ 95,375	22%	0.22(x -44,725) + 1,100 + 0.12(44,7275-11000) = **0.22(x -41,775) + 5,147**	$\frac{0.22\,(x-44,725)+5147}{x}$
95,375 < x ≤ 182,100	24%		
182,100 < x ≤ 231,250	32%		
231,250 < x ≤ 578,125	35%		
x > 578,125	37%		

What are some next steps?

- Webinars on-demand
  - 5/5/20 webinar connecting math with financial literacy
    - credit card activity
    - simple interest activity
    - compound interest activity
- Next Generation Personal Finance
- What else would you like to see?
- Which do you need more, FL lessons to use with your students, or PD for content in FL for yourself (before you feel confident working with students)?

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