Santa Rosa City Schools Course Proposal:

Business Mathematics

Proposal Submitted By: Dr. Rani Goyal; Director, Teaching and Learning

Needs Statement: Discuss how this course fits into your Site and/or the District's goals. Attach minutes of meetings where this course was approved at site or district leadership meetings.

> This course serves as an option for students to meet the graduation requirement of three years of math. This course also meets the Theory of Action and Mission and Vision in that the course content address issues of equity and relevancy.

Graduation Requirements: Specify which requirement is met. (High School only)

> Math

UC a-g Requirements: Specify which requirement is met. (High School only)

> C: math

Explain the rationale for course addition or modification. How does this fit in with district/site goals. Is this course is replacing a current course, which course is it replacing and why? Will this course require new sections? Be explicit.

> This is an additional course option for the third year of math.

Explain the measurable learning outcomes

> The purpose of this course is to lay a foundation in both logical thinking and problem solving while applying these skills to everyday financial decisions.

Course Description (To be used in the course catalog)

> Business math focuses on mathematical skills used in everyday life with the goal of developing intelligent consumers. The practical applications of mathematics are studied using real world situations. Personal finances are emphasized through the study of personal earnings, the elements of business, credit and investments. Concepts such as compound interest and

maximizing profit will connect to mathematical skills such as using exponents and analyzing quadratics.

Detailed Course Design
(Course design should include the objectives, activities, assessments, and standards to be addressed in this course.)

Daily and Key Assignments:

Unit 1: Daily Life Math
1. In this unit, students will learn about their monthly/yearly expenses of their desired lifestyle and making proper adjustments to reducing expenses. They will be able to strengthen their mathematical understanding with their calculations on sales tax, discounts, and tips. Once students learn how to compute their monthly/yearly income, whether hourly/salary/commission, students will be able to compare it with their desired expenses. Students will gain a true understanding of what lifestyle is attainable, and if any, adjustments that need to be made.
2. Students will research their desired lifestyle by listing out their wants and needs in life. They will be able to compute how much money is required to attain this lifestyle. In addition, they will select a desired occupation and analyze their average salary. They will compare their income with their desired expenses. Students will analyze if their occupation will fit their lifestyle. If need be, students will make proper adjustments in their expenses or in their occupation of choice to have the income and life that they desire. In order to understand different types of employment and make informed decisions as to the perks of each, students will construct a Pro's-and -Con's analysis of each type (hourly, salary, commission). They will use these to inform their decision-making process when looking at different types of job opportunities. Students will also compare how much they would make in a given situation based on each. We will use this information to extend into Unit 2, when we introduce average incomes based on education level, income tax and other figures related to employment.
   - 1.1: Consider Wants vs. Needs and compare the monthly & yearly costs of each, while considering how to reduce expenses with adjustments in lifestyle
   - 1.2: Strengthen percentage calculations in the context of sales tax, discounts, and tips… and reinforce rounding to specific places
   - 1.3: Compare incomes via hourly rate vs. annual salary vs. commission

Key Portfolio Assignment:

   - In order to understand different types of employment and make informed decisions as to the perks of each, students will construct a Pro's-and-Con's analysis of each type (hourly, salary, commission). They will use these to inform their decision-making process when looking at different types of job opportunities. Students will also compare how much they would make in a given situation based on each . We will use this information to extend into Unit 2, when we introduce average incomes based on education level, income tax and other figures related to employment.

Unit 2: Working a Job, Understanding a Paycheck and Calculating Income Tax Bracket
1. In this unit, students will learn about how a paycheck is developed. Students will be able to identify all of the key figures to a paycheck such as hourly rates, # of hours worked, taxes, deductions, etc. Students will be able to mathematically justify all of the key figures that were computed onto the paycheck. They will see how their paycheck is calculated.

Students will analyze the differences between an occupation that has hourly pay vs. salary pay. Students will be introduced to income tax brackets and how the deductions change based on the amount of income. Students will be able to calculate effective tax rates.

2. Students will research sample paychecks and analyze the key figures. Students will research how income tax brackets are calculated and, if applicable, students can bring in their own paycheck to confirm the correct calculations of their paycheck. Because there is so much talk of "the government takes much of my money," students will examine IRS estimates of how much tax revenue is lost to varying methods people avoid paying their taxes. Then, they will calculate overall tax amounts (in dollars) and effective tax rates (in percent) based on Income Tax Brackets. Students will explain how people are misguided when claiming things such as "the government takes a third of my money" when somebody is in the 30% tax bracket since a person's entire income is not taxed at the highest percentage…. It is taxed at multiple levels with only the remaining portion being taxed at the highest related bracket level.

- 2.1: Reading a simplified paycheck to identify key figures such as hourly rate, hours worked, and deductions withdrawn.
- 2.2: Computing overall pay based on hourly rate and hours worked and comparing to salary-based-pay
- 2.3: Calculate deductions based on percentage of income
- 2.4: Determine Income Tax Bracket and calculate *effective tax rate*

Key Portfolio Assignment:

Because there is so much talk of "the government takes too much of my money," students will examine IRS estimates of how much tax revenue is lost to varying methods people avoid paying their taxes. Then, they will calculate overall tax amounts (in dollars) and *effective tax rates* (in percent) based on Income Tax Brackets. Students will explain how people are misguided when claiming things such as "the government takes a third of my money" when somebody is in the 30% tax bracket since a person's entire income is not taxed at the highest percentage… it is taxed at multiple levels with only the remaining portion being taxed at the highest related bracket level.

Unit 3: Paying for College

1. In this unit, students will learn about calculating the cost of attending different colleges. They will analyze different sets of tuition, room and board, textbooks, transportation, etc. Students will analyze the pros/cons to commuting vs. living on/off campus. Students will compare their financial aid with their expected cost of attendance and determine if loans are needed to fulfill their cost for college. Students will also learn about subsidized/unsubsidized loans vs. private loans. They will, in detail, analyze the interest rates and the amount of time/money it takes to pay off the loans. Furthermore, they will understand how deferment and forbearance works for loans. Lastly, they will create a budget sheet to determine how much flexibility they have with their money.
2. Students will research average interest rates for student loans and private loans. Students will be able to determine if they need to pay out of pocket after financial aid is provided. With consideration of financial aid, location, and cost of tuition, students will determine which colleges are reasonable to apply to. As students approach their college years, figuring out how much it will cost is a pressing concern. They will calculate loan interest rates based on different college tuitions after factoring in scholarships. While top-tier schools such as Cal Tech, Stanford and the Ivy Leagues certainly have the highest acceptance standards, they are not necessarily the most expensive when considering possible scholarships. In fact, students will learn by exploration that these prestigious schools can even be less expensive than local state schools (or even free) for low-income families. Then revisiting the tuition vs. salary analysis introduced in an earlier unit, students will explain why they think certain institutions are worth it or not.

- 3.1: Calculating cost of attending different colleges based on school expenses (tuition, room & board, books, etc.), scholarships and commuting vs. living on campus
- 3.2: Introduction to loans and interest to pay back those loans
- 3.3: Cost/Benefit analysis of living on campus or commuting
- 3.4: Establishing a budget while in school

Key Portfolio Assignment:

As students approach their college years, figuring out how much it will cost is a pressing concern. They will calculate loan interest rates based on different college tuitions after factoring in scholarships. While top-tier schools such as Cal Tech, Stanford and the Ivy Leagues certainly have the highest acceptance standards, they are not necessarily the most expensive when considering possible scholarships. In fact, students will learn by exploration that these prestigious schools can even be *less* expensive than local state schools (or even **free**) for low-income families. Then revisiting the tuition vs. salary analysis introduced in an earlier unit, students will explain why they think certain institutions are worth it or not.

Unit 4: Credit

1. In this unit, students will learn about how a credit score works and its uses. Students will learn how to obtain a good credit score and how it helps when they need to apply for a car loan or a house loan. Students will learn that a good credit score will generally lead to lower interest rates. We will revisit interest rates and analyze the long term effects of several interest rates in regards to the amount of interest that must be paid back. Students will analyze their spending behavior and learn to build good habits to obtaining a good credit score. Students will be able to compare interest rates on a loan vs. on a credit card. Furthermore, we will have discussions on the benefits and dangers to obtaining a credit card.
2. Students will research several credit card offers and analyze their terms, interest rate, and conditions. Students will then compare the pros/cons of a loan and a credit card. Students construct a chart comparing different credit cards based on credit score required ("excellent," "good," etc.), and any other fees (flat fee, APR, etc.). They will then also create a chart that tracks credit score based on behaviors and payments.

- 4.1: Explain what "credit" is, how it affects every aspect of adult life, and factoring effects on your score
- 4.2: Analyze spending (and saving) habits to compute credit score
- 4.3: Compute interest rates on loans, credit cards, etc. based on credit score

Key Portfolio Assignment:

- Students construct a chart comparing different credit cards based on credit score required ("excellent," "good," etc.), benefits of each card (0% APR, extra points/miles earned, etc.), and any other fees (flat fee, APR, etc.). They will then also create a chart that tracks credit score based on behaviors and payments.

Unit 5: Savings & Loans Interest

1. In this unit, students will learn about the differences between simple and compound interest for several savings and loan scenarios. Students will look at several interest rate offers from surrounding banks and decide which bank that they should open a savings account with. Students will analyze the monthly payments for big item purchases such as buying a house or a car. Students will be able to apply the continuously compounded interest formula when applicable.

2. Students will research interest rates for home loans. Students will analyze trends of home values over time. They'll be able to calculate how much is necessary to pay a mortgage to owning a home. Students will revisit their desired salary/occupation and determine the value of a house that they can afford based on several interest rates. Now that students understand how to read a paycheck and how to compute their income, they will compare different types of bank accounts (and interest levels) to determine where they should open an account. They will produce a chart comparing ending account balances based on different frequencies of interest compounding (annually, daily, continuous, etc.).
- 5.1: Calculate simple & compound interest for given savings & loan scenarios
- 5.2: Use interest rates to decide between bank accounts
- 5.3: Calculate payments on big purchases such as a house and car with interest levels
- 5.4: Use the continuously compounded interest formula

Key Portfolio Assignment:

- Now that students understand how to read a paycheck and how to compute their income, they will compare different types of bank accounts (and interest levels) to determine where they should open an account. They will produce a chart comparing ending account balances based on different frequencies of interest compounding (annually, daily, continuous, etc.).

Unit 6: Present Value
1. In this unit, students will learn about how much money is needed now to get a desired amount in the future.
2. Students will research several prices on a car/house. With several interest rates, students will calculate how much is needed to purchase a car with interest in mind. Students will analyze the differences in paying a house off in 5 years vs. 10 years vs. 25 years. Similarly, students will analyze the difference in payment when purchasing a car with a 24/36/48/60 month loan. From here, students will develop a savings plan necessary to build their capital. Students pick a particular large purchase (car, house, boat, etc.) They would desire at some point in the future (5, 10,25 years, etc.) and research the price. They then calculate how much they need to save now based on a particular interest rate (ex: average inflation rate of 2.5%). Using this, students also develop a savings plan that would produce the necessary starting capital.
- 6.1: Use the formula to determine how much money is needed in the present based on desired amount at a specific point in the future

Key Portfolio Assignment:

- Students pick a particular large purchase (car, house, boat, etc.) they would desire at some point in the future (5, 10, 25 years, etc.) and research the price. They then calculate how much they need to save now based on a particular interest rate (ex: average inflation rate of 2.5%). Using this, students also develop a savings plan that would produce the necessary starting capital.

Unit 7: Retirement
1. In this unit, students will learn about the necessary steps needed to have a good retirement plan. Students will be introduced to 401k, Roth IRA, pre-tax deductions. Students will compute various amounts of 401k contributions based on maximum percentage of income contribution allowed, and factoring in employer-match programs as well. Students will be able to distinguish pre-tax and post-tax accounts and analyzing each of their benefits.

2. Students will research the concept of inflation and how it must be factored into your retirement plan. Students will analyze why keeping money locked away in a safe is almost equivalent to losing money. Looking at three main types of retirement accounts--401(K), Traditional IRA, and Roth IRA -- students will track their contributions over decades based on income levels and return on their investments. They will then produce charts to show how the longer you wait to start planning for retirement, the higher percentage of your paycheck it will cost. A main goal is for every student who currently has a job to immediately open retirement accounts and begin contributing.

- 7.1: Recall *Understanding a Paycheck* lesson that introduced retirement deduction -- 401(k) and relate to tax (i.e. an automatic, pre-tax deduction)
- 7.2: Compute various amounts of 401(k) contributions based on maximum percentage of income contribution allowed and employer match
- 7.3: Compare pre-tax & post-tax retirement accounts and analyze pro's/con's of each (ex: lowering taxable income vs. withdrawing tax-free at retirement)
- 7.4: Use calculations such as the formulas for *Rule of 72* and *Return on Investment* to analyze investment values in retirement accounts over time
- 7.5: Calculate current value of past dollar amounts by factoring in historical inflation rates and use them to explain why keeping money locked away in a safe or at a bank with no interest is akin to actually losing money

Key Portfolio Assignment:

- Looking at three main types of retirement accounts -- 401(k), Traditional IRA, and Roth IRA -- students will track their contributions over decades based on income levels and return on their investments. They will then produce charts to show how the longer you wait to start planning for retirement, the higher percentage of your paycheck it will cost. A main goal is for every student who currently has a job to immediately open retirement accounts and begin contributing.

Unit 8: Stock Investments

1. In this unit, students will learn how to analyze stock investments through analyzing stock performance graphs to pinpointing ideal times to buying and selling.
2. Students will research several stocks and understand how to read their performance graphs. Given the information provided from each stock, students will use their best judgment in deciding which stocks should be considered and which should be avoided. Using online free stock market game, students will compare to become the most successful investor. They will analyze stocks based on price-per-share, earnings-per-share, price-to-earning ratio, size of the company (based on market capitalization), then return on investment history and explain why they chose to invest in particular companies. Students must choose one "cheap" stock (less than $10/share), one "medium" stock (&10-$100/share) and one "expansive" stock (more than $100/share) with their $10,000 in simulated money via the game tool. They are free to invest in other stocks/mutual funds, if they choose, and track their portfolio progress for the length of the unit. At the end, students produce a presentation on what stocks they chose (and why), as well as the financial progress they made.

3. 8.1: Reinforce unit price vs. total cost to prepare for buying multiple shares of multiple stocks
4. 8.2: Calculate profit from selling a stock by comparing its purchase & selling prices
5. 8.3: Practice analyzing stock performance graphs to pinpoint ideal times to buy & sell the stock → make predictions of current stocks based on perceived trends
6. 8.4: Calculate the Price-to-Earnings Ratio of comparably priced stocks to determine which

is a better value to invest in

7. 8.5: Track portfolio value by combining the values of all currently invested stocks and analyze performance to decide what adjustments are needed

Key Portfolio Assignment:

- Using an online free stock market game, students will compete to become the most successful investor. They will analyze stocks based on price-per-share, earnings-per-share, price-to-earnings ratio, size of the company (based on market capitalization), return on investment history and explain why they chose to invest in particular companies. Student must choose one "cheap" stock (<$10/share), one "medium" stock ($10-$100/share) and one "expensive" stock ($100+/share) with their $10,000 in simulated money via the game tool. They are free to invest in other stocks/mutual funds, if they choose, and track their portfolio progress for the length of the unit. At the end, students produce a presentation on what stocks they chose (and why), as well as the financial progress they made.

Unit 9: Owning a Business

1. In this unit, students will learn what it takes, financially, to owning/maintaining a business. Students will revisit the concepts of income and taxes. Students will be able to calculate revenue, rost, and combining them to determine profit margins. Students will learn the concept of maximizing revenue and minimizing cost to yield high profits.

2. Students will build a business, first by coming up with an idea, then determining the costs to establishing a business. Students will factor in employee costs, benefits, inventory costs, rent, etc. Students will develop an excel sheet to account for all the revenues and costs to determine if this business is profitable or not. Students group will build a business then try to stay aflot and become successful with other students as their potential clients. In order to prepare for life as a small business owner, they will need to: Brainstorm product/service students would like to sell & price that might make sense and predict where to establish a business and how much you would need to charge.   Identify necessary costs (employee salaries, benefits, materials for production, location expenses such as rent & insurance, etc.) with the possible extension to financial considerations such as trade tax, valuation,investors/equity/licensing.   Research possible competitors and compare location, quality and cost of competition.   Student businesses will then develop business plans to convince venture capitalists/banks to invest/loan money to help get their business of the ground (while calculating interest as they did earlier in the year).   Once established, students will act as both business owners and customers of each other's business (ex: a restaurant needs to buy produce). We will analyze whose companies were more successful and discuss why that happened

3. 9.1: Revisit earlier material: income, tax, etc.
4. 9.2: Calculate revenue, cost and combine to compute profit
5. 9.3: Maximize revenue & profit (finding the vertex of a downward-facing parabola) and minimize cost

Key Portfolio Assignment:

- Student groups will build a business then try to stay afloat and become successful with other students as their potential clients. In order to prepare for life as a small business owner, they will need to:
    - Brainstorm product/service students would like to sell & price that might make sense and predict where to establish a business and how much you would need to charge

- Identify necessary costs (employee salaries, benefits, materials for production, location expenses such as rent & insurance, etc.) with the possible extension to financial considerations such as trade tax, valuation, investors/equity/licensing
- Research possible competitors and compare location, quality and cost of competition
- Student businesses will then develop business plans to convince venture capitalists/banks to invest/loan money to help get their business of the ground (while calculating interest as they did earlier in the year)
- Once established, students will act as both business owners and customers of each other's businesses (ex: a restaurant needs to buy produce).
- We will analyze whose companies were more successful and discuss why that happened

Budget- budget figures must be included even if they are an estimate.

Projected Costs	Start-up	Ongoing
Personnel (Not to include classroom instructor unless a new section is needed)		
Instructional Material Supplies per student (textbooks, software, etc.)	50,000	
Services (training, equipment maintenance, contracts, etc.)	6,000	
Capital Outlay (remodeling, technology, etc.)		
Total Projected Costs	56,000	

Instructional Materials- must include estimate for new materials even if none have been selected. Place in chart above.

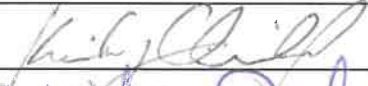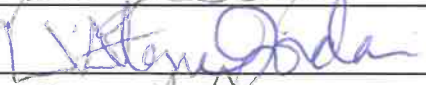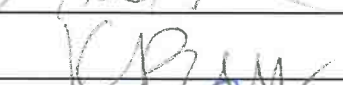| Type	Publisher	Title	ISBN	Author	Copyright	# Have/Need
textbook	Pearson	Personal Finance and Literacy		Madura et al	2010	500 needed
textbook	Glencoe-McGraw-Hill	Mathematics: For Business and Personal Finances		Glencoe-McGraw-Hillstaff	2016	500 needed

Funding Source(s) for Costs and Instructional Materials

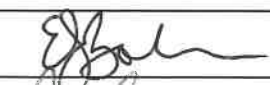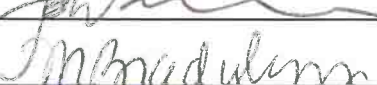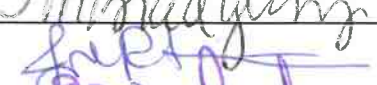|	
Grants (indicate specific grant and grant timeline)	
Categorical Funds (include related programs)	
Career Technical Education (must be for an approved CTE course)	
Department Funds	
Other (be specific)	

Appendix of Additional Documents

Required additional documents include meeting minutes where the course was discussed and approved

District Principal Review and Approvals:

Principal's Signatures	Site	Approved / Not Approved
[signature]	SRHS	Approved
[signature]	RHS	Approved
[signature]	EAHS	Approved
[signature]	McHS	approved
[signature]	PHS	approved
[signature]	MHS	Approved

District Department Chair Review and Approvals:

Department Chair Signatures	Site	Approved / Not Approved
[signature]	SRHS	Approved
[signature]	EAHS	Approved
[signature]	MCHS	approved
[signature]	RHS	Approved
[signature]	MHS	Approved