

WAMC Lab Template

Math Concept(s):

Source / Text:

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Attach the following documents:

- Lab Instructions
- Student Handout(s)
- Rubric and/or Assessment Tool

Short Description (Be sure to include where in your instruction this lab takes place):

- Students apply their understanding of loan amortization through a hands-on project using spreadsheet software and presenting their findings to the class on the third day of instruction.

Lab Plan

Lab Title: Loan Amortization

Prerequisite skills: The student should understand how to calculate algebraic formulas and how to input those formulas into a spreadsheet.

Lab objective: Introduce Students to the concept, mathematical formulas, and tools to analyze and visualize loan repayment schedules and apply their understanding of loan amortization through a hands-on project using spreadsheet software.

Students will present the following findings to the class:

- Monthly payment calculations
- Amortization schedules
- Total cost analysis
- Recommendations based on financial goals (e.g., minimizing interest paid, shorter loan term)

Standards: (Note SPECIFIC relationship to Science, Technology, and/or Engineering)

Mathematics K–12 Learning Standards:

- CCSS.Math.Content.HSA.CED.A.1
- CCSS.Math.Content.HSA.CED.A.4

Standards for Mathematical Practice:

- Make sense of problems and persevere in solving them
- Use appropriate tools strategically
- Attend to precision

K-12 Learning Standards-ELA (Reading, Writing, Speaking & Listening):

- CCSS.ELA.Content.RST.9-10.1
- CCSS.ELA.Content.RST.9-10.3

- CCSS.ELA.Content.RST.9-10.7
- CCSS.ELA.Content.SL.9-10.4
- CCSS.ELA.Content.SL.9-10.5
- CCSS.ELA.Content.SL.9-10.6

K-12 Science Standards

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Technology

- 1: Empowered Learner 1.d
- 2: Digital Citizen 2.b, 2.d
- 3: Knowledge Constructor 3.d
- 5: Computational Thinker 5.a, 5.b

Engineering

Leadership/21st Century Skills:

21st Century Interdisciplinary themes (Check those that apply to the above activity.)			
<input type="checkbox"/> Global Awareness	<input checked="" type="checkbox"/> X Financial/Economic/Business/Entrepreneurial Literacy	<input type="checkbox"/> Civic Literacy	
<input type="checkbox"/> Health/Safety Literacy	<input type="checkbox"/> Environmental Literacy		
21st Century Skills (Check those that students will demonstrate in the above activity.)			
LEARNING AND INNOVATION	INFORMATION, MEDIA & TECHNOLOGY SKILLS	LIFE & CAREER SKILLS	Productivity and Accountability
<u>Creativity and Innovation</u>	<u>Information Literacy</u>	<u>Flexibility and Adaptability</u>	<input type="checkbox"/> Manage Projects
<input type="checkbox"/> Think Creatively	<input type="checkbox"/> Access and Evaluate Information	<input type="checkbox"/> Adapt to Change	<input type="checkbox"/> Produce Results
<input type="checkbox"/> Work Creatively with Others	<input type="checkbox"/> X Use and manage Information	<input type="checkbox"/> Be Flexible	<input type="checkbox"/> Leadership and Responsibility
<input type="checkbox"/> Implement Innovations	<u>Media Literacy</u>	<u>Initiative and Self-Direction</u>	<input type="checkbox"/> Guide and Lead Others
<u>Critical Thinking and Problem Solving</u>	<input type="checkbox"/> Analyze Media	<input type="checkbox"/> X Manage Goals and Time	<input type="checkbox"/> Be Responsible to Others
<input type="checkbox"/> Reason Effectively	<input type="checkbox"/> X Create Media Products	<input type="checkbox"/> X Work Independently	
<input type="checkbox"/> Use Systems Thinking	<u>Information, Communications and Technology (ICT Literacy)</u>	<input type="checkbox"/> X Be Self-Directed Learners	
<input type="checkbox"/> Make Judgments and Decisions	<input type="checkbox"/> X Apply Technology Effectively	<u>Social and Cross-Cultural</u>	
<input type="checkbox"/> Solve Problems		<input type="checkbox"/> Interact Effectively with Others	
<u>Communication and Collaboration</u>		<input type="checkbox"/> Work Effectively in Diverse Teams	
<input type="checkbox"/> X Communicate Clearly			
<input type="checkbox"/> Collaborate with Others			

Teacher Preparation: (What materials and set-up are required for this lab?)

Materials

- Materials list in lesson plan and lab instructions.

Set-Up Required:

- No set-up required.

Lab Organization Strategies:

Leadership (Connect to 21st Century Skills selected):

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Cooperative Learning:

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Expectations: [//wa-appliedmath.org/](https://wa-appliedmath.org/)

- Students will understand how a loan is calculated over time with the loan amount, interest rate, and terms.

Timeline:

- Spreadsheets, presentations, and discussion should take about two class periods of 50 minutes each.

Post Lab Follow-Up/Conclusions:

Discuss real world application of learning from lab

- Real world application would apply to all students trying to procure a loan.

Career Applications

- Any Career that requires understanding and working knowledge of Finance.

Optional or Extension Activities

- Compare different types of loans (fixed-rate vs. variable-rate).
- Explore scenarios with extra payments or early payoff strategies.
- Discuss ethical considerations related to loans and debt management

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Loan Amortization Lab Instructions

Objective: Students will apply their understanding of loan amortization through a hands-on project using spreadsheet software.

Review (15 minutes):

- Briefly recap the concepts from the previous lesson.
- Clarify any remaining questions.

Hands-on Project (50 minutes):

- Instruct students to open spreadsheet software (Google Sheets).
- Provide a loan scenario (e.g., credit card, car, mortgage, or business loan) with specific details: principal amount, interest rate, loan term.
- Guide students through setting up a loan amortization schedule using formulas in the spreadsheet.
- Emphasize the importance of accuracy and formula referencing.

Analysis and Visualization (20 minutes):

- Ask students to analyze the loan schedule: total interest paid and principal repayment over time.
- Discuss how changes in interest rates or loan terms can affect monthly payment and overall cost.

Presentation (15 minutes):

- Have students present their findings and loan schedules to the class.
- Encourage discussion on different approaches and outcomes.

Wrap-up (10 minutes):

- Summarize key learnings about loan amortization.
- Connect the project to real-world financial planning and decision-making.

Washington

Loan Amortization Scenarios

Calculator.net (Amortization Calculator)

Review the yearly and monthly schedule

Car Loans:

New Car Loan: You are borrowing money to purchase a brand-new vehicle. Typically, new car loans have lower interest rate compared to used car loans. Your car has a final cost of \$26,500 with an interest rate is 6.3% for a term of 36 months.

Used Car Loan: You are financing for purchasing a pre-owned vehicle. Interest rates may be higher than new car loans and can vary based on the age and condition of the car. Your used car has a final cost of \$13,595 with an interest rate is 9.2% for a term of 30 months.

Credit Loans:

Personal Line of Credit: You are applying for a revolving credit account that allows you to borrow up to a certain limit. You can borrow and repay repeatedly, paying interest only on the amount borrowed. You borrow \$5000 with an interest rate is 8.5% with a plan to pay off the balance in 15 months.

Consolidation Loan: You are borrowing money to combine multiple debts into a single loan with a lower interest rate, usually used to simplify payments or reduce interest costs. You borrow \$3500 with an interest rate is 12.2% with a plan to pay off the balance in 24 months.

Mortgage Loans:

Fixed-Rate Mortgage: A loan with a fixed interest rate for the entire term of the loan, providing predictability in monthly payments. Your mortgage total is \$396,500 with an interest rate is 4.5% for 30 years.

Adjustable-Rate Mortgage (ARM): A mortgage with an interest rate that can change periodically, typically after an initial fixed-rate period. Monthly payments can

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fluctuate based on market conditions. Your mortgage total is \$510, with an initial interest rate is 4.5% for 30 years. After 36 months you interest rate changed to 5.2%

Business Loans:

Small Business Administration (SBA) Loan: Government-backed loans for small businesses, providing favorable terms such as lower down payments and longer repayment periods. Your loan total is \$1,300,500 with an interest rate is 3.7% for 15 years.

Term Loan: A lump sum loan repaid over a fixed term, often used for specific business purposes like equipment purchase or expansion. Your mortgage total is \$735,000 with an interest rate is 3.9% for 10 years.

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