

## **WAMC Lab**

Math Concept(s): Exponential growth, compound interest

Source / Text: Financial Algebra 2018

Developed by: Reva Fowler E-Mail: rfowler@sheltonschools.org

Date: Summer Conference 2017

### **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):**

This lab would be used with a unit on future value of investments. Students are tasked with creating and demonstrating an investment strategy, using an interest-bearing account, that would accrue a minimum of one million dollars. They are to choose single or periodic investment, amount invested, frequency and rate of compound interest, and the time in years. Students are provided with the appropriate formulas and graphing calculators, but must create their problem-solving strategy as a group. Each group then presents to the class their solution.

### **Lab Plan**

Lab Title: *How to Make a Million Dollars*

Prerequisite skills: Know how to apply compound interest formulas, including both single and periodic investment formulas

Lab objective: The student will determine the investment, interest-bearing account strategy, frequency and rate of compound interest, and number of years required to accrue a minimum of one million dollars.

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

Mathematics K–12 Learning Standards:

- FIF8b. Use the properties of exponents to interpret expressions for exponential functions. For example, identify percent rate of change in functions such as  $y = (1.02)^t$ ,  $y = (0.97)^t$ ,  $y = (1.01)^{12t}$ ,  $y = (1.2)^{t/10}$ , and classify them as representing exponential growth or decay.

Standards for Mathematical Practice:

- Problem Solving - Make sense of problems and persevere in solving them.
- Reasoning and Proof - Reason abstractly and quantitatively.
- Communication and Representation - Construct viable arguments and critique the reasoning of others.
- Use appropriate tools strategically
- Attend to precision

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

- Read word problems and extract necessary information; reason analytically; make conclusions and construct arguments to defend them

K-12 Science Standards

Technology

- Use graphing calculator functions effectively

Engineering

Leadership/21st Century Skills:

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

<https://wa-appliedmath.org/>

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

### Materials

- Graphing calculators
- pencil and paper
- display method (whiteboard with markers or butcher paper, etc.)

### Set-Up Required:

- Copies of handouts
- display method available

## **Lab Organization Strategies:**

Leadership (Connect to 21<sup>st</sup> Century Skills selected):

### *Students will:*

- Work as a group to create and use a strategy for an interest-bearing investment that will yield a million dollars
- Use a graphing calculator skills appropriately and effectively
- Identify and create solutions for any obstacles to a solution
- Be able to logically support and clearly communicate a solution to the class
- Guide, support, and cooperate with each other to complete the task within the time limit

### Cooperative Learning:

- Arrange students in groups of 2 to 4.
- Each group needs a recorder and a timekeeper. Tasks should be assigned following your classroom management system.

### Expectations:

- The student should be able to identify the appropriate formulas and use them correctly to calculate single versus periodic investment results

### Timeline:

- 55 minute class period:
  - Introduction & organization: 10 min
  - Work time: 25 min.
  - Presentation time: 15 min.
  - Clean up: 5 min.

## **Post Lab Follow-Up/Conclusions:**

Discuss real world application of learning from lab

- Deepens the student's understanding of the possibilities and limits of investment growth through interest-bearing accounts
- Concepts can be applied to many business and personal investment situations

### Career Applications

- Business, Finance

### Optional or Extension Activities

- <https://wa-appliedmath.org/>