

Analyzing Earning and Savings Data

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for the STEM Education Center at WPI's Summer 2023 Research Experience for Teachers program

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Subject: Math & Computer Science

Grade Level: High School

United Nations Sustainable Development Goal 1: Eliminating Poverty

Overview

You are a highschool student working a part time job. You want to save up for something cool, but you also have expenses. Using a dataset of earnings and expenses, predict how long it will take you to save up enough money to get the thing you want.

Standards & Learning Targets

Analyze a complex data set to answer a question or test a hypothesis (e.g., analyze a large set of weather or financial data to predict future patterns).

Vocabulary	Tier 1 - Everyday	Tier 2 - School	Tier 3 - Classroom
	Predict	Plot, Analyze	Data/Dataset
What do students need to KNOW ?	<ol style="list-style-type: none"> 1. A programming language 2. How to download/upload a dataset 3. How to work with variables 4. How to use loops to iterate over a dataset 5. How to do calculations with integer operations 		
What do students need to DO ?	<ol style="list-style-type: none"> 1. Predict when they will have the target amount of savings 2. Plot data 3. Analyze a dataset 		
What will students CREATE ?	<ol style="list-style-type: none"> 1. Students will create a visualized plot of the data showing how long it will take to achieve the desired savings 		

ELA Standard: Make strategic use of digital media (e.g., audio, visual, interactive elements) in presentations to enhance understanding of findings, reasoning, and evidence and to add interest.

Vocabulary	Tier 1 - Everyday	Tier 2 - School	Tier 3 - Classroom



What do students need to KNOW ?	<ol style="list-style-type: none"> 1. 2. 3. 		
What do students need to DO ?	<ol style="list-style-type: none"> 1. Summarize the work they've done into a short presentation (slides, pictures, descriptions) <ol style="list-style-type: none"> a. Present to the class b. Share if there is anything they could see spending less on to get to their goal faster 		
What will students CREATE ?	<ol style="list-style-type: none"> 1. A presentation of their work and results 		

Prior Knowledge

- Coding
- Loops
- Variables
- Integer operations
- File uploading

Materials/Resources

Computer with an Integrated Development Environment (IDE)

Timeline of Activities

Duration	Activity	Instructions	Product
Throughout	Expected routines	<p>Students will share their work with another and get help when needed.</p> <p>Students that are ahead will provide guidance to those that need assistance.</p>	Peer discussion
Day 1		<p>Introducing the project</p> <ol style="list-style-type: none"> 1. Provide a Python code template that generates an initial dataset with randomized variables for hours worked, days worked, expenses, hourly wage, and goal saving 	A dataset and an item they want to save up for



		<p>amount. Each student will run this code to create their unique dataset.</p> <p>2. Instruct students to choose a specific item they want to save up for (e.g., a car, earrings, a new phone) and note its cost.</p>	
Day 2		<p>3. Allow students to edit the Python code that generates the initial dataset with their own part-time job earnings, expenses, hourly wage, and goal saving amount to personalize the dataset.</p> <p>4. Formulate a hypothesis or questions related to their earnings data, savings goal, and weekly spending (e.g., "Can I save enough to buy the item in six months while accounting for my weekly spending?" or "What adjustments do I need to make to reach my savings goal more quickly?").</p>	Have a question or hypothesis
Day 3		<p>5. Analyze the dataset using Python and Pandas to determine the total earnings, savings required, and monthly savings amount needed to reach their goal.</p>	
Day 4		<p>6. Visualize the earnings, savings progress, and weekly spending over time using Python libraries like Matplotlib or Seaborn.</p>	Plot of earnings over time
Day 5		<p>7. Interpret the visualizations and calculations, considering the impact of weekly spending on their savings progress.</p> <p>8. Draw conclusions and identify strategies to balance spending and savings, considering the feasibility of their savings goal.</p>	
Day 6		<p>9. Prepare a presentation that includes their analysis, hypothesis, conclusions, customized dataset, customized salary scenario, and weekly spending estimates.</p>	Have a presentation prepared
Day 7		<p>10. Present their findings to the class, fostering a constructive discussion and allowing for questions and feedback from peers.</p>	



Attending to Equity - Teaching Strategies

Strategy	Explain how the strategy contributes/relates to the lesson/activity
Get to know your student interests and regularly use those interests in problems/highlight when you use those interests in problems	The students get to pick the amount they are saving up based on something they want to buy.
Make sure topics students are struggling with are taught in class not just as homework	Based on how students are doing/where they are in the activity, I can take the parts they are struggling on and go over how to go about solving them with the class.
Share instructional responsibility	Have students share their work with their peers and get help when needed. This will happen throughout the whole process.

Career Connections

Computer Scientist, Data Analyst, Economics

Have someone come in and explain how they do their finances/save up for things.

Assessment

[Analyzing Earnings and Savings Data Rubric](#)