WAMC Lab Template

Math Concept(s): Creating and solving equations in one variable.

Source / Text: CORD

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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):

This is an introductory lab that we will experience during the first several weeks of the school year. The concept

Lab Plan

Lab Title: Missing Birth date Lab

Prerequisite skills: Critical thinking, reasoning, equation solving skills.

Lab objective: Given the average of a set of coded birthdate data, and all of the data points except one, calculate the missing value.

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

Mathematics K–12 Learning Standards:

- A - CED - 1: Create equations and inequalities in one variable and use them to solve problems.
- A - REI - 1: Explain each step in solving a simple equation as following from the equality of numbers asserted at the previous step, starting from the assumption that the original equation has a solution.

Standards for Mathematical Practice:

- 1, 2, & 6

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

- L.7.3a. Choose language that expresses ideas precisely and concisely, recognizing and eliminating wordiness and redundancy.

Engineering

- NGSS CCC - 4: . Systems and system models. Defining the system under study—specifying its boundaries and making explicit a model of that system—provides tools for understanding and testing ideas that are applicable throughout science and engineering.

Leadership/21st Century Skills:

21st Century Interdisciplinary themes (Check those that apply to the above activity.)

☐ Global Awareness ☐ Financial/Economic/Business/Entrepreneurial Literacy ☐ Civic Literacy
☐ Health/Safety Literacy ☐ Environmental Literacy

21st Century Skills (Check those that students will demonstrate in the above activity.)

LEARNING AND INNOVATION

Creativity and Innovation
- ☐ Think Creatively
- ☐ Work Creatively with Others
- ☐ Implement Innovations

Critical Thinking and Problem Solving
- X Reason Effectively
- ☐ Use Systems Thinking
- ☐ Make Judgments and Decisions
- ☐ Solve Problems

Communication and Collaboration
- X Communicate Clearly
- X Collaborate with Others

INFORMATION, MEDIA & TECHNOLOGY SKILLS

Information Literacy
- ☐ Access and Evaluate Information
- ☐ Use and manage Information

Media Literacy
- ☐ Analyze Media
- ☐ Create Media Products

Information, Communications and Technology (ICT Literacy)
- ☐ Apply Technology Effectively

LIFE & CAREER SKILLS

Flexibility and Adaptability
- ☐ Adapt to Change
- ☐ Be Flexible

Initiative and Self-Direction
- ☐ Manage Goals and Time
- ☐ Work Independently
- ☐ Be Self-Directed Learners

Social and Cross-Cultural
- ☐ Interact Effectively with Others
- X Work Effectively in Diverse Teams

Productivity and Accountability
- ☐ Manage Projects
- ☐ Produce Results

Leadership and Responsibility
- ☐ Guide and Lead Others
- X Be Responsible to Others

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

Materials

- Three by five note cards - one per student and one for each group.

Set-Up Required:

- Create groups of four or five students each

Lab Organization Strategies:

Leadership (Connect to 21st Century Skills selected):

- Students will have to communicate clearly and reason effectively to solve this puzzle.

Cooperative Learning:

- Students will have to cooperate within their groups to have a product to pass along to the next group.

Expectations:

- Students will be able to create a useful equation that they can solve for the missing data point.

Timeline:

- 50 to 100 minutes

Post Lab Follow-Up/Conclusions:

Discuss real world application of learning from lab

- What if you have only one quiz left to take in a class and you want a grade of at least B- ? What would be the minimum score you could earn on that last test?

Career Applications

- Creating a system model such as this is a powerful tool for analyzing a product or an entire company.

Jerrold Rice
Lab Instructions,
Missing Birthdate

In this lab, your group will be creating a mathematical puzzle for another group to solve. As you might imagine, that means that your group will be getting a puzzle from another group to solve. This is how we will create our puzzles:

- 'Encode' your birth date. Multiply the month by 100 and add the day of the month that you were born. For instance, if you were born on December the 25th, your encoded birthday would be 1225. That's 1200 for the twelfth month plus 25 for the date you were born. We are not using the year. My birthday is nearer the Summer Solstice than the Winter Solstice - June 11th. The encoded version of my birthday would be 611.
- Each person should write their encoded birthday on a three by five card. Calculate your group's 'mean' and write that on the group's card. Label that card 'mean'. The other cards need no label, they need only the encoded dates.
- Remove one encoded birth date card from your stack and stick it in a pocket or someplace.
- Put the 'mean' card on top of the remaining pile. Trade your stack of cards to another group for their stack of cards.
- Using the mean and the known data values in the puzzle set you receive, calculate the value of the missing card.
- 'Decode' the data value you calculated and confirm that it is correct with the group whose pile you have.

Today we will celebrate our success by proving we can do it one last time. I'll write the problem on the board.