# Multitasking Mania

PBL Statement

Target Grade Level: Middle School

Subjects: Computer Science, Math and Science

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**Problem Statement:**

Company BleepBlorp has problems with efficiencies in the workplace that they think might be related to the employees trying to do to many things at once. Company BleepBlorp makes many products, but has a small group of employees, and business is growing. They need to keep up with demand. Company BleepBlorp doesn’t want to hire more workers, but wants to get things done more efficiently. They have asked you for help and expertise in determining the impacts of multitasking, if any, and to help their employees understand the impacts as well through a computer game to be used for training purposes.

Your task is to create both a computer-based task and non-computer-based task that helps employees evaluate the effectiveness of multitasking and helps them plan their work efficiently. Your completed project should include the following criteria/constraints:

* A computer based game that takes one minute to complete
* A simultaneous “off line” activity
* A method to collect data

**Unit Overview and Table of Contents**

Guiding Question:

How do we know if multitasking (including device distraction) is hurting our ability to learn, think critically, and use our time efficiently?

In terms of content, students could complete the project as a stand alone unit. The basic concepts are covered within the Multitasking PBL:

* Multitasking - what is it and what do we know about it
* SCRATCH programming and algorithm development
* What makes a good lesson/teaching opportunity for the customer
* Budgeting within constraints (time, complexity…)
* Math - coordinates, quadrants (take advantage of higher level math of 6-8 graders)
* Programming - algorithms (basic instructions, if-then decisions)
* Programming - coding discipline (commenting, variable assignment, etc)
* Social interaction in a professional environment (talking to, writing for the customer)

**Lesson Overview**

*Lesson 1: A Multitasking Experiment*

Introduce the “bead game” as a real world example of multitasking and collect data to evaluate its effectiveness

*Lesson 2: Measuring the Difference*

Review data collected in Lesson 1 and debate whether multitasking works

*Lesson 3: Scratch Introduction*

Learn about the Scratch programming language

*Lesson 4: Researching the Problem*

Review literature and research into multitasking

*Lesson 5: Scratch Advanced Blocks*

Learn about conditional statements and sensing blocks

*Lesson 6: Multitasking, the Brain, and Career Pathways*

Discuss how the brain multitasks and learn about careers in research

*Lesson 7: Timer & Data Tracking*

Learn how to use variables to create a timer and score a game in Scratch

*Lesson 8: Planning Multitasking Project*

Work with a partner to plan both a Scratch game and offline task that may be done together to evaluate multitasking

*Lesson 9: Creating Multitasking Project*

Create a game in Scratch

*Lesson 10: Data Collection*

Conduct multitasking experiment with classmates and gather data

*Lesson 11: Data Analysis*

Analyze data collected and draw conclusions about the effectiveness of multitasking

**Provide the following items for the entire unit:**

**Standards (NGSS, CCSS, CTE):**

|  |  |
| --- | --- |
| Computer Science (CTE) | |
| CTE 2-A-5-6 | Develop programs, both independently and collaboratively, that include sequences with nested loops and multiple branches. [Clarification: At this level, students may use block-based and/or text-based programming languages.] |
| CTE 2-A-6-10 | Use an iterative design process (e.g., define the problem, generate ideas, build, test, and improve solutions) to solve problems, both independently and collaboratively. |
| Science (NGSS) | |
| MS-ETS1-1. | Define the criteria and constraints of a design problem with sufficient precision to ensure a successful solution, taking into account relevant scientific principles and potential impacts on people and the natural environment that may limit possible solutions. |
| MS-ETS1-2. | Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem. |
| MS-ETS1-3. | Analyze data from tests to determine similarities and differences among several design solutions to identify the best characteristics of each that can be combined into a new solution to better meet the criteria for success. |
| MS-ETS1-4. | Develop a model to generate data for iterative testing and modification of a proposed object, tool, or process such that an optimal design can be achieved. |
| Language Arts (CCSS) | |
| CCSS W 7.1.B | Support claims(s) with logical reasoning and relevant evidence using accurate, credible sources and demonstrating an understanding of the topic or text. |
| [CCSS.ELA-LITERACY.RI.6.7](http://www.corestandards.org/ELA-Literacy/RI/6/7/) | Integrate information presented in different media or formats (e.g., visually, quantitatively) as well as in words to develop a coherent understanding of a topic or issue. |
| [CCSS.ELA-LITERACY.RI.6.8](http://www.corestandards.org/ELA-Literacy/RI/6/8/) | Trace and evaluate the argument and specific claims in a text, distinguishing claims that are supported by reasons and evidence from claims that are not. |
| [CCSS.ELA-LITERACY.RST.6-8.9](http://www.corestandards.org/ELA-Literacy/RST/6-8/9/) | Compare and contrast the information gained from experiments, simulations, video, or multimedia sources with that gained from reading a text on the same topic. |
| Mathematics (CCSS) | |
| 6.NS.C.8 | Apply and extend previous understandings of numbers of the system of rational numbers. |

**Soft Skills:**

1. Learning and Innovation
   * Creativity and Innovation
   * Critical Thinking and Problem Solving
   * Communication and Collaboration
2. Information, Media and Technology
   * Technology Literature
3. Life and Career
   * Flexibility and adaptability
   * Initiative and self-direction
   * Productivity and accountability

**Locally and/or Personally Relevant for Students:**

* Many students play video games and use apps that are built on programming
* Many current and future jobs require programming skills

**Connections to career and educational pathways:**

* This unit will introduce many skills that will be useful for careers in STEM.
* Where applicable, the unit identifies specific career pathways that require skills taught during individual lessons. These include Computer Programmers, Business Analysts, and Research Scientists