Pax and Gus Challenge Problem

Seventh and Eighth Grade Math

Developed by:
The teachers, students, and mentors in the
Gaming Research Integration for Learning Laboratory® (GRILL®) Summer 2015

TABLE OF CONTENTS

Table of Contents **2**

1. Pax and Gus **3**

1.1. Introduction 3

1.2. Problem 3

1.3. Parameters 3

1.4. Project Write-Up 3

1.5. Rubric 4

1. PAX AND GUS

Primary Resource: Thinking Mathematically (Mason, Burton, Stacey)

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1.1. INTRODUCTION

Running is one of the oldest activities known to man. Centuries ago, man would run purely to survive. Man's oldest ancestors would gather in packs to run down their dinner. Over the course of many miles, the tribes would tactically separate animals from their herd and surround them over long distances. After a long duration of tracking, the animal would be worn down to the point of collapse. The herdsmen needed tracking skills, great endurance, and the crafted tools to go in for the final kill.

Over time, running transformed from a survival skill to an activity of sport and contest. People would race against one another after undergoing grueling training in order to earn the respect and love from their countrymen. The Olympic Games emerged as early as 776 BC, in which a foot race of 600 feet in length took place. Victory of this first foot race was claimed by a cook named Koroibos.

Today, running is both a leisurely activity as well as a competitive and highly commercialized event. Usain Bolt, Mo Farah, Michael Johnson, Dennis Kimetto, and Kenenisa Bekele are but a few of the fastest people in the world and each have raised the bar of running in select events.

1.2. PROBLEM

Two brothers, Pax and Gus are two fitness fanatics who enjoy going on a daily run together. Today, they are both starting at Gus's house and running to Pax's house.

During the run, Pax runs half the way and walks the other half. Gus runs for half the time and walks for the other half. They both run and walk at the same speeds. Who finishes first? Why?

1.3. PARAMETERS

- You must implement and record at least 2 simulations of this problem at two different running/walking speeds.
- You must record finishing times accurate to the nearest second for the selected races.
- You must represent at least one of your races as an equation with appropriately selected variables.
- You must provide an explanation for your final answer that could make sense to a friend who has never seen the problem.

1.4. PROJECT WRITE-UP

- Statement of the Problem
- List of Parameters
- Visual Representation of the Simulations (Races)
- Total Time to Complete Simulation (Races)
- Equation Representing Time for Simulations
- Conclusion
  - Description of why Pax or Gus wins the race(s)
  - Rationale provided for any math work shown and speeds/distances chosen

1.5. RUBRIC

Category	Components	Points Earned	Comments
Calculations	- Speed and time simulations (at least 3) are provided with corresponding distances - One simulation has been shown with visuals with times and speeds given	/30	
Project Write-Up	- All components listed under "Project Components" are included and explained with visuals, math work, and research	/25	
Solution Presentation	- Presentation of solution is prepared with visuals, is easy to follow, and lasts between 3-5 minutes	/20	
Assumptions	- Any and all assumptions are stated and at the beginning of the appropriate section and explained	/15	
Grammar and Mechanics	- Correct grammar and mechanics - Units are used appropriately - Layout is simple and easy to follow	/5	
Works Cited Page	- All research used in project is found under Works Cited page and is consistent in format	/5	
Total		/100	