BUSINESS MATH

MOREY'S PIERS

BUSINESS MATH

SELF GUIDED WORKSHOP

GRADES 5-12

Dear Education Extravaganza Participant,

Congratulations on your decision to participate in the Education Extravaganza **the Amusement Operations Business Math self-guided workshop**! This workshop has been designed to provide you with an **applied math experience**, offering insight into many of the **day to day calculations and business math decisions** made in an amusement park setting. Morey's Piers is a business and to be able to operate successfully it must analyze calculations to help managers make smart decisions. These decisions can either help a business make money, or lose money.

Educator Endorsement:

Morey's Piers provides a remarkable, educational and fun experience for students. The opportunity for students to see how a real, local, business works from behinds the scenes is exciting and empowering for kids of all ages.

In the summer of 2016, our Business & Finance Academy visited Morey's Piers as a portion of our Summer Seminar program. We were warmly greeted, participated in a discussion about the business and its marketing, management and human resources practices, toured the facility, enjoyed the piers and completed the Business Math Self-Guided Workshop. We were the first to complete the workshop and have been working with Morey's Piers to make the workshop the best possible experience for teachers, advisors and students.

In this packet you will find: directions for educators including pre and post-visit activities, a partial list of related NJ Core Curriculum Standards, directions for students, a glossary of terms, a variety of hands on questions related to 4 (four) rides, for students to answer while at the park and/or once you return home, and an answer key for your use.

You will be stunned to watch your students become engaged not only in riding the rides, but in understanding all of the problem solving that is required to make business decisions. It will surely make everyone look at Morey's Piers in an enlightening way. My students are already begging to go back. Have fun in the sun, by the beach, using math and learning about business.

Business is everywhere…. even at the boardwalk, all you have to do is look for it!

Jennifer Orzechowski

Williamstown High School

Business & Finance Academy Advisor

EDUCATORS:

There are five (5) sections of the workshop. The first four (4) sections are identified by an attraction name. The fifth section provides a challenging summary analysis for advanced students. Sections 1-4 are structured to include questions of various difficulty levels which are identified as ***Basic*** through ***Advanced Complex***. The questions are designed to build upon each other, allowing the student to apply prior learning and information from one section to the next. Teachers can elect to assign their students questions of a specific difficulty level or range so as to offer a differentiated instruction experience. Section 5 of the workshop can be completed during your visit or as a post-trip lesson plan back in the classroom. Students can work individually or in groups and should be encouraged to share information and learning in order to complete the workshop.

The Glossary of Amusement Operations Terms and Assumptions provides interesting information that will be critical for the student to complete the self-guided workshop.

Pre-trip Activity Suggestions:

The Glossary of Amusement Operations Terms and Assumptions should be used in coordination with a pre-visit lesson plan such as:

- Student creation of flash cards for the terms and assumptions
- Student research of the current New Jersey Minimum Hourly Wage and recording of this information in the space provided. This information will be necessary to complete the *Complex* and *Advanced Complex* questions in the workshop.
- Student research of Morey's Piers starting at https://www.moreyspiers.com/

Post-trip Activity Suggestions:

- Discussions:
  - Discuss the workshop questions/calculations.
  - What is the importance of these calculations for the business?
  - What type of careers/jobs would utilize this type of data?
  - What would managers do with the results of this data?
- Student individual/team presentations based on their research, opinions, trip experience

STUDENTS:

- Please complete as many questions as you can for each attraction/section.
- Questions range in difficulty from *Basic* to *Advanced Complex*.
- Ask your teacher(s) which questions you should complete during your visit to Morey's Piers.
- Please review the Glossary of Terms and Assumptions prior to answering any questions.
- You may need to refer back to the Glossary section of this handbook during your participation in the workshop.
- Feel free to use a calculator to answer questions in the workbook, but always remember, it is NEVER safe or permitted to hold or use any loose articles, such as a calculator or cell phone, *while riding* any attraction.

**<u>BEFORE</u> COMPLETING THE WORKSHOP:

Google "Current NJ Minimum Wage" and fill in the blank below.
You will need this information to complete the workshop

New Jersey (NJ) Minimum Wage:

$_____ per hour.

<u>WHILE AT THE PIERS</u>:

For Each Ride:

1. Find the ride
2. Observe the ride in operation
3. The first two questions listed for each ride ask the minimum height requirement and total ticket cost. You can find this information at each ride location.
4. Answer the remaining questions for each attraction per your teacher's requirements.

GLOSSARY OF

AMUSEMENT OPERATIONS TERMS and ASSUMPTIONS

Attraction:
Amusement Ride.

Ticket Cost:
Tickets are a form of admission to all attractions. Each attraction is assigned a ticket value or "cost" of admission. For this workshop, the cost per ticket is $1.10.

Queue Line:
A roped or fence off area next to an attraction where guests stand and wait before loading onto a ride.

Minimum Height Requirement:
The minimum height (inches) that a guest must be in order to ride an attraction.

Load:
Getting seated and secured into an attraction ride vehicle.

Unload:
Leaving the ride area after an attraction has come to a complete stop.

Theoretical:
Tested beliefs or outcomes, commonly regarded as correct, that can be used to predict future performance.

Run Time:
The amount of time (minutes/seconds) that an attraction will physically move from start to finish.

Load Time:
The theoretical amount of time (minutes/seconds) it should take to move guests from the queue line and secure them into the ride vehicle seats.

Unload Time:
The theoretical amount of time (minutes/seconds) it should take for guests to exit the ride area following the end of Run Time.

Cycle Time:
Load Time + Ride Time + Unload Time = Cycle Time

Theoretical Capacity:
The maximum number of guests that can ride the attraction per hour.

Staffing Level:
The number of employees required to operate an attraction. Each attraction has a Minimum and Maximum staffing level which is determined by the anticipated hourly guest attendance at the ride throughout the day.

Efficiency:
The percentage of an attraction's actual hourly attendance when compared to its theoretical hourly capacity.

KIDDIE SWINGS ATTRACTION
(Min Staffing Level (1), Max Staffing Level (2))

BASIC

1) What is the **Minimum Height Requirement** for the attraction? _____

2) How many **Tickets to** Ride this attraction: _____
What is the **Cost per Tic**ket: $_____
What is the attraction's **Total Ticket Cost**: $_____

3) There are 16 ride vehicles and 1 seat per ride vehicle. What is the maximum number of guests that can ride per **Ride Cycle**? _____

MODERATE

4) If the **Load Time** is 1 minute, and the **Run Time** is 2 minutes, and the **Cycle Time** is 30 seconds, what is the **Unload Time**? _____

ADVANCED

5) Given the attraction's **Cycle Time**, what is the **Theoretical Hourly Capacity** for the Kiddie Swings? _____

COMPLEX

6) What is the theoretical maximum **Revenue** (Capacity x Total Ticket Cost) at the Kiddie Swings per hour? _____

KITE FLYER ATTRACTION
(Min Staffing Level (1), Max Staffing Level (2))

BASIC

1) What is the minimum height requirement for the attraction? _____

2) How many **Tickets to Ride** this attraction? _____
What is the **Cost Per Ticket?** $_____
What is the attraction's **Total Ticket Cost?** $_____

3) There are 12 ride vehicles and 2 seats per ride vehicle. What is the maximum number of guests that can ride per ride cycle? _____

MODERATE

4) If the **Load Time** is 1 minute, and the **Run Time** is 2 minutes, and the **Unload Time** is 30 seconds, what is the **Cycle Time**? _____

ADVANCED

5) Given the attraction's cycle time calculated above, what is the **Theoretical Capacity** for the Kite Flyer? _____

COMPLEX

6) What is the theoretical maximum of **Revenue** at the Kite Flyer per hour? _____

ADVANCED COMPLEX

7) The NJ Minimum Wage per hour is $_____
At maximum staffing, what is the maximum **Profit** (Revenue – Payroll) that can be generated per hour at the Kite Flyer? _____

MOBY DICK
(Min Staffing Level (1), Max Staffing Level (2))

BASIC

1) What is the minimum height requirement for the attraction? _____

2) How many **Tickets to Ride** this attraction? _____
What is the **Cost Per Ticket?** $_____
What is the attraction's **Total Ticket Cost?** $_____

3) There is 1 ride vehicle and 24 seats per ride vehicle. What is the maximum number of guests that can ride per ride cycle: _____

MODERATE

4) If the **Unload Time** is 30 seconds, **Run Time** is 1 minute and 30 seconds, and the **Cycle Time** is 3 minutes, what is the **Load Time**? _____

ADVANCED

5) Given the attraction's **Cycle Time**, what is the **Theoretical Capacity** for the Moby Dick? _____

COMPLEX

6) What is the maximum **REVENUE** that can be generated per hour at the Moby Dick? $_____

ADVANCED COMPLEX

7) The NJ Minimum Wage per hour is $_____.
At minimum staffing, what is the maximum **PROFIT** (Revenue – Payroll) that can be generated per hour at the Moby Dick? _____

SEA SERPENT
(Min Staffing Level (3), Max Staffing Level (6))

BASIC

1) What is the minimum height requirement for the attraction? _____

2) How many **Tickets to Ride** this attraction? _____
What is the **Cost Per Ticket?** $_____
What is the attraction's **Total Ticket Cost?** $_____

3) There are 7 ride vehicles and 4 seats per ride vehicle. What is the maximum number of guests that can ride per ride cycle? _____

MODERATE

4) If the **Load Time** is 1 minute, **Run Time** is 1 minute and 45 seconds, and the **Unload Time** is 15 seconds, what is the **Cycle Time**? _____

ADVANCED

5) Given the attractions cycle time, what is the **Theoretical Capacity** for the Sea Serpent? _____

COMPLEX

6) What is the maximum **REVENUE** that can be generated per hour at the Sea Serpent? _____

ADVANCED COMPLEX

7) The NJ Minimum Wage per hour is $_____. At full staffing, what is the maximum **Revenue** that can be generated per hour at the Sea Serpent? _____

8) If the Sea Serpent operates at 85% efficiency with minimum staffing, 90% efficiency with 4 staff members, and 95% efficiency at maximum staffing, at what staffing level will the ride be most **Profitable**? _____ **hint: not a numerical answer*

STAFFING FOR MAXIMUM EFFICIENCY AND REVENUE (CRITICAL ANALYSIS – ADVANCED COMPLEX)

1) At minimum staffing, which attraction, the Kite Flyer or Moby Dick, is most profitable per hour?

_____

2) It requires 11 staff members to operate all 4 attractions in this exercise at maximum staffing and efficiency. Assuming each reduction in a staff member results in a 25% reduction in efficiency, if you have five (5) staff members "call out" (not show up for work), which ride(s) would you take them from in order to have the least impact on **Profit**? Explain your answer:

_____

_____

_____

3) At the Kiddie Swings, if you can load three quarters of the rides' vehicles in 3 minutes and 30 seconds, but all of the ride vehicles in 4 minutes, which loading pattern will generate more revenue per hour?

_____

4) If you had to close a ride other than the Kiddie Swings, due to staffing levels, which ride would you close to ensure the least amount of impact on combined hourly **Profit**?

_____

5) If all four rides are operating at 95% efficiency at maximum staffing, what is the total combined **Profit** you will generate per hour?

_____