

MIDDLE SCHOOL

EDUCATIONAL WORKBOOK



Includes:
Physics, Math, and Creative Thinking



PHYSICS

FIRST LAW OF MOTION (Law of Inertia):

An object at rest will remain at rest, and an object in motion will remain in motion with the same speed and in the same direction unless acted upon by an unbalanced external force.

SECOND LAW OF MOTION (Law of Acceleration):

The acceleration of an object is directly proportional to the net force acting on it and inversely proportional to its mass. This is often written as the equation:

$$F=ma$$

THIRD LAW OF MOTION (Action and Reaction)

For every action, there is an equal and opposite reaction.

1. Newton's Laws

The Pirate Ship ride swings back and forth.

Explain how Newton's First Law applies when the ride stops swinging.

How does Newton's Third law explain the push you feel when the ship moves upward?

2. Friction

The Sky Glider moves smoothly across its cables.

What role does friction play in the motion of the Sky Glider?

Name one way engineers might reduce friction in this system.

3. Speed and Velocity (Use the equation: $\text{speed} = \text{distance} / \text{time}$)

A rider measures their speed on the Log Ride.

If the log travels 100 meters in 20 seconds, what is its speed?

MATH

1. Ride Wait Times

The average wait time for the Giant Dipper is 25 minutes, and for the Carousel, it's 15 minutes.

If a student rides both, what is the total wait time?

If the student spends 60 minutes at the Boardwalk, how much time remains for other activities?

2. Ride Times

If the Giant Dipper ride takes 2 minutes and 30 seconds per ride:

How many rides can it complete in 1 hour?

If a student rides it 5 times, how much total time will they spend on the ride?

3. Carousel Cones

Carousel Cones sells cones for \$4.50 each.

If a group of 8 friends each buys a cone, what is the total cost?

If they leave a 15% tip, how much do they pay altogether?

4. Ticket Prices

A family of 5 is planning to visit the Boardwalk. If each person needs a \$50 unlimited ride wristband:

How much will the family spend in total?

If they buy their tickets in advance and receive a discount for 10% off, what is the total cost after the discount?

CREATIVE

1. Create a New Ride

Imagine you are an amusement park designer. What unique ride would you add to the Boardwalk? Describe the ride's theme, mechanics, and target audience.

2. Event Planner

Plan an exciting event for a day at the Boardwalk. What activities would you include to make it the best day ever?

Bonus Question!

Visit the Boardwalk Historium (2nd floor in Neptune's Kingdom) and list 1 fact you learned.