Name _____ Date _____

Physics Lab #17 (85 pts)

Period _____ Mrs. Nadworny

Partners: Due Date: _____

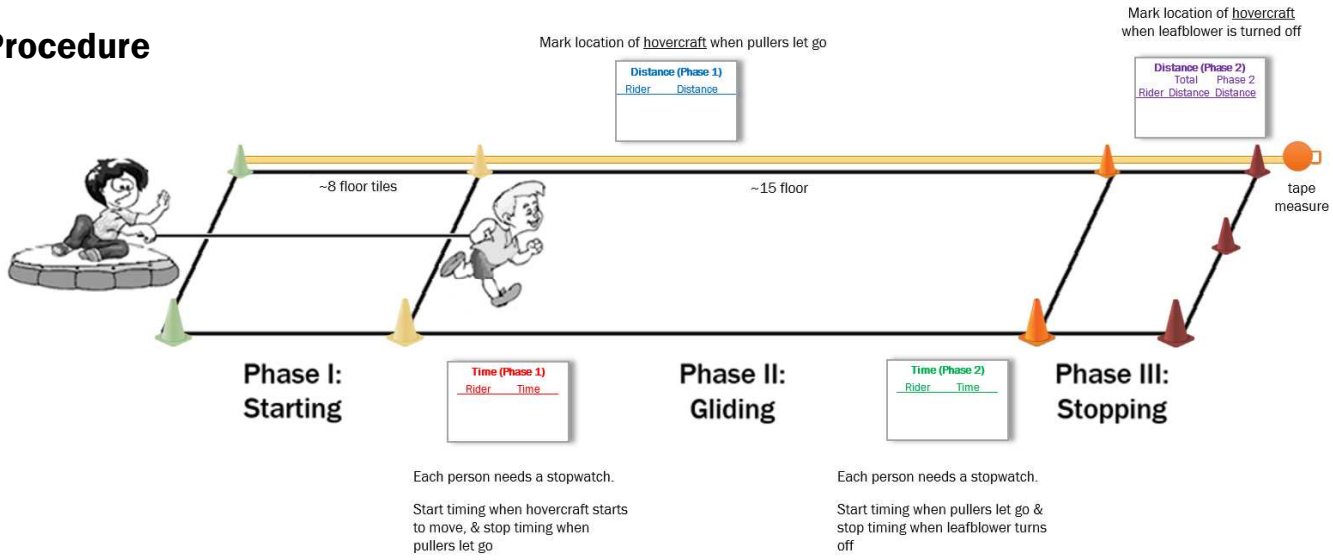
Hovercraft

NO Lab Write-Up Required

Purpose

1. To describe the motion of a hovercraft using the formulas of kinematics.
2. To explain the behavior of a hovercraft using Newton's Laws of Motion.

Procedure



A hovercraft is a vehicle capable of gliding over relatively smooth surfaces, supported by a cushion of air. The cushion of air significantly reduces the friction experienced by the hovercraft. **For the purposes of our lab, when the hovercraft is on, it is considered frictionless.** [Neglect air resistance.]

- Observe the type of motion in each phase. Sketch and label a free body diagram for each phase below. (9 pts)

Phase I	Phase II	Phase III
The person on the hovercraft is pulled by the rope to get them moving. 	After the pulling has stopped, the hovercraft will glide across the floor without friction to hinder it. 	Once the rider decides to stop and turns off the leaf-blower, the hovercraft will quickly slow down and stop. **No numerical data will be taken in this phase, only observations.** 

Data Collection

My data taking responsibility is to _____ (5 pts)

Phase I (15 pts)

Rider				
Distance (m)				
Time (s)				
Acceleration (m/s^2)				

Phase II (15 pts)

Rider				
Total Distance Traveled (m)				
Distance Traveled in Phase II (m)				
Time (s)				
Speed (m/s)				

Data Processing

From the data taken for Phase I, calculate the magnitude of the acceleration of the hovercraft for each trial. Place the final results in the table above. Show a sample calculation using the GUESS method. (5 pts)

From the data taken for Phase II, calculate the speed of the hovercraft for each trial. Place the final results in the table above. Show a sample calculation using the GUESS method. (5 pts)

Questions: Answer all questions in the spaces provided.

1. State Newton's First Law of Motion. (2 pts)

_____

_____

2. State Newton's Second Law of Motion. (2 pts)

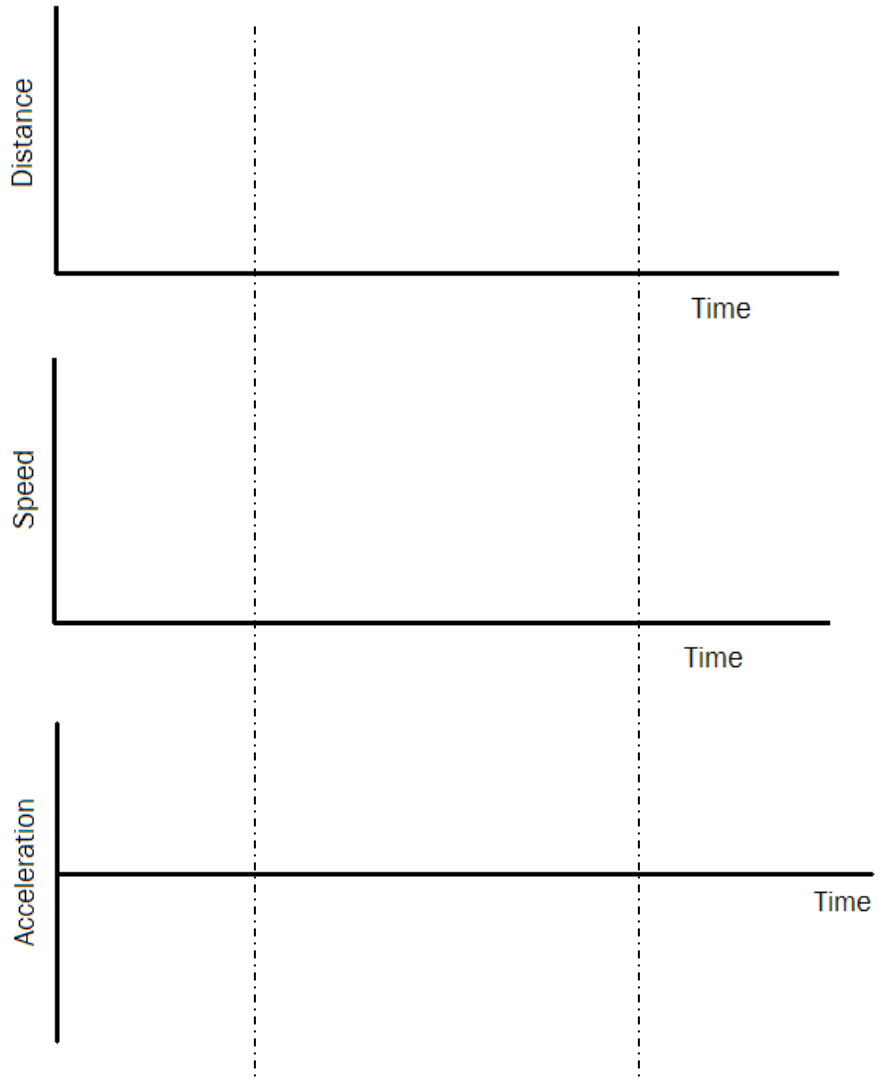
_____

_____

3. For each phase identify whether the hovercraft was moving with relatively constant velocity, accelerating or decelerating. (3 pts)

• Phase I _____ • Phase II _____ • Phase III _____

4. Complete each graph below for one entire trip of the hovercraft. Be sure to label each phase. (These are sketch graphs. Numerical values do not need to be shown.) (9 pts)



5. Were the forces on the hovercraft balanced or unbalanced in (3 pts)

• Phase I _____ • Phase II _____ • Phase III _____

6. Which of Newton's Laws (first law or second law) primarily applied to the hovercraft in (3 pts)

• Phase I _____ • Phase II _____ • Phase III _____

Use your free-body diagrms on page one as well as your answers to the previous questions to explain *why* the hovercraft had the type of motion (acceleration or constant velocity) it did during (9 pts)

- **Phase I**

- **Phase II**

- **Phase III**