**Oaks Park 2018**

This assignment is your final for this class. You are to complete a group research project and present it to the rest of the class. The presentation should be visual (like, but not necessarily PowerPoint) and will be presented to the class. Your peers will grade it. You will be working in groups of 3-5 – but we need to make sure that no class has more than 8 or so presentations.

We will gather our data at Oaks Park – and we will spend the week of the Oaks Park field trip planning our data acquisition. As a class, we must gather data on **all** the rides, and as a group you need to investigate in some depth **3** rides.

Here are all the rides with suggestions on what you might want to measure. For each of the 3 rides you choose, you decide what you want to do – **you don’t need to do all the suggestions** – an in-depth study of just one aspect is OK.

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| --- | --- | --- | --- | --- | --- |
| **Bumper Cars**  momentum, speed, energy, power, g force | | **Ferris Wheel**  g force, vertical circle, period, radius | | **Adrenaline Peak ($6) /Zoom**  energy, circular motion, g force, vertical circle | |
| **Rock-O-Plane**  vertical circle, radius, period, g force | | **Zero-G (Formerly Eruption/Round up)**  radius, centripetal force, vertical circle, g force | | **Scrambler**  radii, centripetal force, g force | |
| **Spider**  vertical motion, g force, circular motion | | **Big Pink Slide**  energy, velocity, g force, height, mass, friction | | **Disk ‘O**  centripetal acceleration, radius, g force | |
| **Go-Karts** ($)  acceleration, g force, friction | | **Balloons of Death and Vomiting**  Period, velocity, centripetal acceleration, “g” force | | **Scream-N-Eagle**  pendulum, period, g force, heart rate, | |
| **Herschell-Spillman Carrousel**  coriolis effect, g force, circular motion | **Rock & Roll**  g force, angle of car tilt, g force, centripetal force | | **The Frog Hopper**  vertical g force | | **Drop Tower**  vertical g force |

**Ideas for gathering data:** stop watch, meter stick, string, video analysis, protractor, accelerometer, accelerometer on LabQuest, and photos. We have a notebook where you can request videos, pictures, LabQuest data, and direct measurements. There are many good apps that you can use on your phone - I bought Sensor Kinetics which for like $3 lets you save files.

**Things you can measure:** Length, period, g force, height, radius, angle, speed

I will bring my camera along – it will take movies. (i.e. if you want to ride a ride with a camera, or make your own documentary, please use your own) We will post videos on the website later for you to work on.

**For example:** (just examples)

On the Eruption you could request the radius of the ride be measured, request a video of the ride and request that axial (straight ahead) acceleration data be taken. You could ride the ride on Oaks Park day and time the period. Later you could calculate the centripetal acceleration and compare this with what you measured and what the axial acceleration data says. You can look at the pretty acceleration data and talk about when the ride is tipped up. You could use video analysis of the ride to also confirm the centripetal acceleration.

On the Frog Hopper you could request video of a ride, and vertical acceleration data. On Oaks park day you could ride the ride with your accelerometer. You could use video analysis of the ride to determine the upward acceleration, and calculate what the g-force should be. You can compare this to what you measured with your own accelerometer, and with the vertical accelerometer data.

On the Carrousel you could film the throwing of a paper wad radially (it appears to curve due to the coriolis effect), time the period of motion, request a measure of the radius, request lateral acceleration data, calculate the tangential velocity, calculate the centripetal acceleration, measure the centripetal acceleration, and compare the lateral acceleration three ways.

**Your presentation should include:**

* Brief description (and history if possible) of the ride
* What your investigation was
* How you collected data
* What your results were

Your slide show might have 4 slides – but you might have more if you have slides that are just pictures. Avoid having lots of words on your slides. If you want to make a short video (5-7 minutes) you may, just upload it to YouTube to we can show it to the class.

For ideas follow the link on the Physics web page (tuhsphysics.ttsd.k12.or.us) to Oaks Park, and then click on “Video Analysis Website”. If you scroll down, there are a series of videos where I talk about ideas for the rides. Also on the Oaks Park page, there is a link to “Data Analysis Tips” that goes through a couple of basic analyses.