Midway Physics Day Teacher Training Event
Tuesday, October 3, 2023
6:30 pm – 7:30 pm
Zoom

Led by **Yanwen Wu and Nancy Kesar**

Midway Physics Day Website: http://go.sc.edu/midwayphysicsday

This is your "go-to" resource for all Midway Physics Day communications!

Topics Discussed:

- **Description of Midway Physics Day and General Logistics:**
    - **Buses Park for free, $10.00 per vehicle for parking (cash only at the gate)**
    - Fair opens and Midway Physics Day events begin at **11:00 am**
    - Wristbands are valid for **admission** and **unlimited rides** until **2:00 pm**
    - Demonstrations occur from **11:00-12:00**, rides open at **12:00**
    - All "real physics" demos led by USC Physics and Astronomy faculty and students
    - Midway Physics Day will be located near the **Academic Avenue Stage** (location circled on map in your envelopes and via our website)
    - Do not forget to **"check in"** at the table set up near the **Academic Avenue Stage** when you arrive. If you have un-used wristbands or end up needing a few more (due to your wristband counts changing), please contact Nancy Kesar. Also, checking in helps our team confirm that the schools receiving wristbands are attending Midway Physics Day each year.
    - There will be **event surveys** at the check-in table that will be distributed to all teachers. The survey is a critical part of our post-event assessment and your

thoughts and feedback are greatly appreciated. **Please complete and return your surveys to us at the table prior to leaving the tent**. There will also be an **online survey option** (either a completed hard copy survey or online survey requested, not necessary to do both) sent via e-mail to all participants shortly after the event.

- **Midway Physics Day Tips and Tricks:**
    - Prepare a lesson plan in advance.
    - Plan instructional activities for the bus ride from your schools to the fairgrounds to prepare students. Activities on the ride back to your schools could also be done.
    - Use the lunch period to re-group, analyze, finish data sets, coordinate, etc.
    - Plan some free time and make it fun!
    - Choose only a few rides to analyze. There are many distractions taking place at the fair. Don't try to over-extend yourselves.
    - Decide on the types of questions and calculations to implement in advance.
    - Prepare activities and logistics with your students before arriving at the fair.
    - Make sure that students can do everything before and/or at the fair.
    - Bring **print-outs**, **calculators**, **pencils**, **protractors**, etc.
    - Plan lessons that align with course objectives.
    - Keep it simple and practice in advance!
    - Budget time so that students are successful.
    - Measurements can be detailed or estimated.

- **Strategies for Various Fair Rides:**

    - **Ferris Wheel**
        - Measure height of ride with a protractor or via air pressure
        - Measure period/frequency of rotation

    - **Roller Coaster**
        - Newton's Laws, Conservation of Energy (Height of Hills)
        - What forces are involved?
        - Where are forces strongest? Weakest?

    - **Drop of Fear**
        - Magnetic force braking
        - Measure free fall, calculate speed, measure height of ride

    - **Starship 2000 / Gravitron**
        - Circular motion, can measure radius of ride as well as the time period to calculate acceleration

Your Phone is a Measuring Device!

- **Arduino Science Journal**

    - Students can measure experiment results, take quality photos, jot down important notes, record observations, and much more.

    - Arduino Science Journal is a **free** app that is fully compatible with both Android and iOS devices. Search for "Arduino Science Journal" in your app store and download directly to your phone or other device.

    - For more details, visit https://www.arduino.cc/education/science-journal.

Conclusion:

- Midway Physics Day is a **fun** and **effective** way to motivate your classes about science!

Microsoft Teams Chat Resources from Fellow Teachers:

- **PhyPhox – Physical Phone Experiments** (https://phyphox.org/)
    - Students can complete these labs with their phones using video directions.
    - Suggestions include centrifugal acceleration, free fall, and elevator (https://phyphox.org/experiment/?video=1)
- **Amusement Park Physics Kit Manual:**
    - https://cdn.pasco.com/product_document/Amusement-Park-Physics-Kit-Manual-ME-9426A.pdf
- **Amusement Park Physics Project:**
    - https://docs.google.com/document/d/1i5R1VGCRtDrzlH6QeSA4TUd50R2W48qfnW_T9hN_2f0/edit
- **Past Midway Physics Day Analyses:**
    - **Before the Fair -** https://drive.google.com/file/d/19MOeVvGVTdHiEvoveUU25kscDEys-hPA/view
    - **After the Fair -** https://drive.google.com/file/d/1MbPzpUJjKmokn5-hyYcYjAtAR4lf83no/view?usp=sharing
- **YouTube Videos:**
    - **Libelium / Port Aventura –** "Wireless Sensors to measure acceleration in roller coasters"
    - **Engineerguy –** "How a Smartphone Knows Up from Down (accelerometer)"

**** All wristbands for Midway Physics Day have been mailed or distributed in person. If you are receiving your wristbands via mail, they will arrive in yellow 9x12 envelopes and will have our return address at the top left-hand corner. ****

Please contact Nancy Kesar via phone (803-777-8105) or e-mail (nkesar@mailbox.sc.edu) with any questions or concerns you may have prior to the event.

We look forward to seeing everyone on Tuesday, October 17!