“Science, Mathematics And Research Training -
Woodlawn High School Science Education Outreach”

Number of students: 6
Transportation: (organized by Woodlawn High school)
7/31~8/5/2008:
7/31, 8/1, 8/4: Arrival 9:45 am, departure 4:15pm, location: 5720 S. Ellis Ave.
8/2 museum tour:
Arrival 11:30 am at 5720 S. Ellis Ave., then to Adler Planetarium
Departure 4:00 am at Adler Planetarium, then stop at 5720 S. Ellis Ave.
8/5: Arrival 9:45 am, departure 6:00 pm, location: 5720 S. Ellis Ave.

Organizer contact:
Eileen Sheu (General organization):  773 834 9916, e-sheu@uchicago
Cheng Chin (General organization):  773 702 7192, cchin@ucnicago
Athena Frost (Museum tour): 773-203-5163, anfrost@uchicago.edu

Agenda:
**Thursday, 7/31**
<table>
<thead>
<tr>
<th>Event (Heinrich Jaeger)</th>
<th>Location</th>
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<tbody>
<tr>
<td>Arrival (Eileen, K.A., Dennis)</td>
<td>5720 S. Ellis Ave.</td>
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<tr>
<td>10:00 ~ 10:45 am: Welcome, breakfast and introduction (Eileen, K.A., Helen)</td>
<td>KPTC 213</td>
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<td>10:45 ~ 12:00 am: Fluids and granular materials (Heinrich, Helen)</td>
<td>KPTC 213</td>
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<tr>
<td>12:00 ~ 12:30 pm: Lunch (Eileen, K.A., Dennis)</td>
<td>KPTC 213</td>
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<tr>
<td>12:30 ~ 1:30 pm: Lab tour (Heinrich’s group, Helen)</td>
<td>Heinrich’s lab</td>
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<tr>
<td>1:30 ~ 2:00 pm: Lab safety and organization meeting (Van Bistrow, Heinrich, Helen)</td>
<td>KPTC 208</td>
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<tr>
<td>2:00 ~ 4:00 pm: Experiment and discussion (Heinrich, Helen)</td>
<td>KPTC 208</td>
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<td>4:15 pm: Departure</td>
<td>5720 S. Ellis Ave.</td>
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**Friday, 8/1**
<table>
<thead>
<tr>
<th>Event (Kathy-Anne Brickman, Zosia)</th>
<th>Location</th>
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<tbody>
<tr>
<td>Arrival and breakfast (K.A., Dennis)</td>
<td>5720 S. Ellis Ave.</td>
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<tr>
<td>10:00 ~ 11:00 am: Resonances in mechanical systems (K.A., Zosia, Arjun, Scott)</td>
<td>KPTC 213</td>
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- periodic motion: period and frequency
  * Pendulum, metronomes, tuning fork, planet motion
- vibration and natural resonance frequency
  * Cell phone, motor, bridge, sound waves and glasses
| 11:00 ~ 12:00 am: Experiment I: (K.A., Zosia, Athena, Arjun, Scott) |
12:00 ~ 12:30 pm:     Lunch (Athena, Dennis)     KPTC 213
12:30 ~ 1:30 pm:     Experiment II:   
(K.A., Zosia, Athena, Arjun, Scott)
1:30 ~ 2:30 pm:     Experiment and discussion   
(K.A., Zosia, Athena, Arjun, Scott)
1. Coupled pendula and coupled gliders on air track (apparatuses: Van Bistrow)
2. Synchronization of metronomes (apparatus: Van Bistrow)
3. Other experiments:
   Determine the vibration frequency of your cell phone, a tuning fork, floor, music notes…
Supporting materials and videos:
Tacoma narrows:  http://www.youtube.com/watch?v=3mclp9QmCGs
Haunted swing:  http://www.youtube.com/watch?v=0yk-oQ_28ns
Experiment videos:
Resonance energy transfer:  http://www.youtube.com/watch?v=Oan-SfR9tyM
Metronomes:  http://www.youtube.com/watch?v=W1TMZASCR-I
Sound waves:  http://www.youtube.com/watch?v=17tqXgvCN0E
2:30 ~ 4 pm:     Experiment demonstration     KPTC 120
(Dennis Gordon, K.A., Zosia)
Demonstration (D. Gordon): Bartollin pendula and flame tube
4:15 pm:     Departure     5720 S. Ellis Ave.

Saturday, 8/2
11:30 am:     Arrival     5720 S. Ellis Ave., Adler
12 ~ 4 pm:     lunch and museum tour     Adler Planetarium
4 pm:     Departure     Adler, 5720 S. Ellis Ave.

Sunday, 8/3

Monday, 8/4
9:45 pm:     Arrival and breakfast     5720 S. Ellis Ave.
(Eileen, Dennis)
10:00 ~ 11:00 am:     Vortex rings and fluid dynamics     KPTC 213
(Eileen)
11:00 ~ 12:00 am:     Experiment I:   
(Eileen)
12:00 ~ 12:30 pm:     Lunch   
(Eileen, Dennis)
12:30 ~ 1:30 pm:     Experiment II:   
(Eileen)
2:30 ~ 3:30 pm:     Experiment III:   
(Eileen)
3:30 ~ 4:00 pm:     Discussion   
(Eileen)
4:15 pm:     Departure     5720 S. Ellis Ave.
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<tr>
<td>9:45 pm:</td>
<td>Arrival and breakfast</td>
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<td></td>
<td>(Nate, Kara, William, Dennis)</td>
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<td>10:00 ~ 10:45 am:</td>
<td>Waves and patterns at home</td>
<td>KPTC 213</td>
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<td></td>
<td>- Wave and resonance phenomena: 2D and 3D vibrations and standing waves</td>
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<td>10:45 ~ 11:00 am:</td>
<td>Experiment demonstration</td>
<td>KPTC 213</td>
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<td>(Nate, Kara, William)</td>
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<td>11:00 ~ 12:00 pm:</td>
<td>Experiment I:</td>
<td>KPTC 208</td>
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<td>12:30 ~ 1:30 pm:</td>
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<td>Discussion</td>
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<td>(Nate, Cheng, Kara, Dennis)</td>
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<tr>
<td>3:30 ~ 6 pm:</td>
<td>BBQ party</td>
<td>KPTC 206 balcony</td>
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<td></td>
<td>(Nate, Scott, Dennis)</td>
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<td>6 pm:</td>
<td>Departure</td>
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Experiments:
1. Chlodny plate (Apparatus: Dennis Gordon) with other fixtures and horizontal plastic strips
2. Vertical hoop (Dennis Gordon)
3. Faraday waves (Apparatus: Eileen)

Ideas:
- Pattern formation experiments
  1. Water with pepper
  2. Coffee with milk
  3. Salt on top of a vibrating plastic plate

Faraday wave experiments:
1. water in a plastic cup on top of the shaker
2. dragging styrofoam cup with water
3. two fluids?

Supporting materials and videos:
http://www.youtube.com/watch?v=Pfs4Rd5f_IQ
http://www.youtube.com/watch?v=wMIvAsZvBiw

Other ideas:
- Liquid nitrogen experiments?

Topics of discussion to encourage continuing interest in science:
1. Online physics resources: hyperphysics, our SMART website, personal contact (Nate)
2. How should one prepare to go to college and study science? (Athena)
3. Necessary science courses they should take in high school. (David Epstein)
4. Other science outreach programs (Eileen)
5. Getting a career in science or science education. (Heinrich, Eileen)