

“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	Event (Heinrich Jaeger)	Location
9:45 am	Arrival (Eileen, K.A., Dennis)	5720 S. Ellis Ave.
10:00 ~ 10:45 am:	Welcome, breakfast and introduction (Eileen, K.A., Helen)	KPTC 213
10:45 ~ 12:00 am:	<i>Fluids and granular materials</i> (Heinrich, Helen)	KPTC 213
12:00 ~ 12:30 pm:	Lunch (Eileen, K.A., Dennis)	KPTC 213
12:30 ~ 1:30 pm:	Lab tour (Heinrich’s group, Helen)	Heinrich’s lab
1:30 ~ 2:00 pm:	Lab safety and organization meeting (Van Bistrow, Heinrich, Helen)	KPTC 208
2:00 ~ 4:00 pm:	Experiment and discussion (Heinrich, Helen)	KPTC 208
4:15 pm:	Departure	5720 S. Ellis Ave.
Friday, 8/1	Event (Kathy-Anne Brickman, Zosia)	Location
9:45 am:	Arrival and breakfast (K.A., Dennis)	5720 S. Ellis Ave.
10:00 ~ 11:00 am:	<i>Resonances in mechanical systems</i> (K.A., Zosia, Arjun, Scott)	KPTC 213
	- 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 (Dennis Gordon, K.A., Zosia)	KPTC 120
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Demonstration (D. Gordon): Bartollin pendula and flame tube

4:15 pm:	Departure	5720 S. Ellis Ave.
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Saturday, 8/2

	Event (Athena Frost)	Location
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

	Event (Eileen)	Location
9:45 pm:	Arrival and breakfast (Eileen, Dennis)	5720 S. Ellis Ave.
10:00 ~ 11:00 am:	<i>Vortex rings and fluid dynamics</i> (Eileen)	KPTC 213
11:00 ~ 12:00 am:	Experiment I: (Eileen)	KPTC 208
12:00 ~ 12:30 pm:	Lunch (Eileen, Dennis)	KPTC 213
12:30 ~ 1:30 pm:	Experiment II: (Eileen)	KPTC 208
2:30 ~ 3:30 pm:	Experiment III: (Eileen)	KPTC 208
3:30 ~ 4:00 pm:	Discussion (Eileen)	KPTC 208
4:15 pm:	Departure	5720 S. Ellis Ave.

Tuesday, 8/5	Event (Nate Gemelke)	Location
9:45 pm:	Arrival and breakfast (Nate, Kara, William, Dennis)	5720 S. Ellis Ave.
10:00 ~ 10:45 am:	<i>Waves and patterns at home</i> - Wave and resonance phenomena: 2D and 3D vibrations and standing waves (Nate, Kara, William)	KPTC 213
10:45 ~ 11:00 am:	Experiment demonstration (Nate, Kara, William)	KPTC 213
11:00 ~ 12:00 pm:	Experiment I: (Nate, Cheng Kara, William)	KPTC 208
12:00 ~ 12:30 pm:	Lunch (Nate, Kara, William, Dennis)	KPTC 213
12:30 ~ 1:30 pm:	Experiment II: (Nate, Cheng, Kara, Dennis)	KPTC 208
2:30 ~ 3:30 pm:	Discussion: (Nate, Cheng, Kara, Dennis)	KPTC 208
3:30 ~ 6 pm:	BBQ party (Nate, Scott, Dennis)	KPTC 206 balcony
6 pm:	Departure	5720 S. Ellis Ave.

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)