Notes from two lunchtime workshops with Caltech Classroom Connection - about how to present science to kids

Workshop #1
December 4, 2008
CCC team: James Maloney, Jen Franck, Tara Gomez
Participants: Nina Lin, Willy Amidon, Alan Chapman, Steve Kidder

Connect with the kids – you were a kid once!

- Introduce yourself, ask them their name
- Say what you do, ask them what grade they are in

What are your goals?

- Show what scientists do
- Show that science is accessible to everyone
- Inspire kids to learn more science
- Have fun!

Engage the kids

- Have hands on activities, such as
  - Drawing on balloons – for stress and strain
  - Triangulation exercise – for locating earthquakes
  - Cutting clay pictures – for faults
  - Sheets covered in dots – for how big is a million
  - Slinky – for s and p waves
  - Different kinds of rocks – metamorphic

Ask questions, such as

- What do you notice about …
- Why is there a mountain?
- Why does this rock look like this?

Use analogies, such as

- Liquefaction is like your feet in the sand at the beach
- Locating the distance of and earthquake with S and P waves is like locating the distance of lightening using the time difference between seeing the lightening and hearing the thunder

Also, have free goodies

- Pens, stickers, hats, geology kits

And please include:

- Caltech's Tectonics Observatory
- TO website: http://tectonics.caltech.edu/outreach
- Thanks to Henry and Betty Moore Foundation

Afterwards, evaluate how it went:

- Look at their body language. Did they smile? Did they ask questions? Were they happy?

……

Workshop #2
May 12, 2009
CCC team: James Maloney, Tara Gomez
Participants: Willy Amidon, Steve Kidder, Nina Lin, Anthony Sladen, Aron Meltzner

General strategies:

- Learn through experience.
- Define your learning objectives. Then pick activities that best help do this.
- Different types of learning: visual, kinesthetic …
- Use probing questions
- Use scientific method – ask what they expect to see, write answers on the board, do the experiment, compare with predictions
- Have something that they can take home – rock collection, magnifiers
- Teach something cool about science, and how this is important to everyone, even those who will not be scientists.
- Can point out science is teamwork (some go in field, some do calculations, some do lab experiments), international.

Classroom visit:

- Give email to teacher for follow-up questions.

Eaton Canyon:

- Make sure there are at least 2 adults for each group
- Have patience!
- Give high energy students extra jobs
- Have eye contact with each kid so they feel connected as well as stay in line
- Don't always lead like a mother duck; be inside the group as well
- No ipods
- Could say, at the beginning, "What do you expect to see?" Write this down. Then at end of hike can review.
- Things to discuss:
    - Faults, rock types, weathering, patterns, waterfall
- Have activities ready for during breaks.
- Some activities:
    - Work sheet with names of things to find, or with actual photos (can work in teams, and can get prize)
    - Count the number of times you see something, such as a certain type of rock.
    - During lunch break, could sketch something

    - Use notebook for observations, reflections, diagrams, questions.
        - See: sciencenotebooks.org
    - Maybe have a few vocabulary words in mind. Then:
        - What do you see?
        - Geologists call this …..;
        - Write in notebook "A fault is …."
    - What are the important features? Draw them.
- One strategy: Talk about something. Then ask "What do you see over there?"

Science Fair:

- Nina's idea for outreach activities that have K-6th grade: make their own rock collection.

TO Tours:

- As you meet the students, welcome them to Caltech and to your lab.
    - Introduce yourself. Let them know where you are from. Ask them if they know what a graduate student / postdoc is. Tell them where you went to undergrad school.
    - Let them know how you became interested in science; why you are working in science
    - Let them know what else you like to do besides science – what are your hobbies?
- Discuss and show your cutting edge science
- Tell them one question you are trying to answer, such as
    - An experiment you are trying to perform
    - A scientific claim you are trying to make and HOW you know it is true
    - A tool you use in your research (e.g., glove box, mass spec, computer…)
    - The broader implications of your work
    - Highlight that experiments fail
    - Mention where your funding comes from
- Check to see that students are engaged by asking them questions all along, such as
    - Can anyone tell me about …