Welcome to the Summer Engineering Academy workshop!
We are very happy to have you!
BUT you must…

BEHAVE YOURSELF!

Heheheh!
Quick Introductions

- Engineering in Practice directors and fellows
- Teachers and school participants – School? Subjects taught?
- Students – School? Grade?
Fish [http://youtube.com/watch?v=4ewPCADX4eA](http://youtube.com/watch?v=4ewPCADX4eA)
Dog, water, stairs [http://youtube.com/watch?v=LwfrFm5wAuY](http://youtube.com/watch?v=LwfrFm5wAuY)
Pig tricks [http://youtube.com/watch?v=aLmWz1kvhZg](http://youtube.com/watch?v=aLmWz1kvhZg)
Cat yawning: [http://youtube.com/watch?v=LQ5m75qZlyk](http://youtube.com/watch?v=LQ5m75qZlyk)
Charlie bit me: [http://youtube.com/watch?v=_OBlgSz8sSM](http://youtube.com/watch?v=_OBlgSz8sSM)
Freezing Frogs: [http://youtube.com/watch?v=uRx_cl826Mo](http://youtube.com/watch?v=uRx_cl826Mo)
Meet our hamsters

Is there a left / right preference?

Can you make (or change) a left / right preference?

Answer question 9
A break...already?

- Hamsters need time to "consolidate"
- And we need time to set up

SO...
Take a 5 minute break

http://www.chem.arizona.edu/~kellerp/about/fly-2.gif
This is an animal?

**Hydra Polyp**

Whole Mount of an entire animal

- tentacles with cnidocytes
- mouth
- bud
- gastrovascular cavity
- ovary
Move to page 3 while your hamsters are resting…

Observe natural behavior

Observe feeding behavior

Design your experiment – have teacher approval before starting

**Remember to answer the questions along the way.**
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<thead>
<tr>
<th>Duration</th>
<th>Moving Around</th>
<th>Waving tentacles</th>
<th>Tentacle stretch</th>
<th>Tentacles to mouth</th>
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<th>Crunch Midsection</th>
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What is your conclusion?

- Do chemicals alone evoke feeding behavior?
- Did you accept or reject your hypothesis?
Question #5 & 6: What type of behavior is this?
Based on this experiment, what type of behavior can animals display?

Animals can display innate behavior.
Back to the Hamsters

- Back to page 2, #11
- Did the animals “learn”? 
Based on this experiment, what type of behavior can animals display?

Animals can display learned behavior.
Animals can display both learned and innate behavior.

http://chesschumpion.blogspot.com/2007/03/time-to-put-on-your-thinking-caps.html
Your tasks
- Research natural behavior of a select animal
- Research Ethology and ethogram
- Design an ethogram for a select animal

Start with www.ethograms.org
Field Trip!!

- Take...
  - Your worksheet
  - Pencil / Pen
  - YOUR LUNCH!
- We will eat on the way.
- We will finish the worksheet on the way back.
Stay together for a unique visit with zoological engineers at the zoo.
- Review page 11 prior to visit
- Afterwards, go straight to your select animal’s exhibit for observations.

Meet back at the van no later than 3:30 pm.
Let’s Go!!