**Day 11 Plan**

**TO DO:**

* **Install Python**
* **Find useful netlogo models**
* **Create Complex Systems presentation**
* Test light sensor
* Gradient sheet
* Simple robot
* Get kit
* Darken windows
* Print Posters

**Morning:**

* Demonstrate Rube Goldberg Machines (get video)
* Take apart, clean up
* Programming tasks
* how to use IDLE
* Go through some of tutorial
  + [http://docs.python.org/tutorial/introduction.html](http://www.google.com/url?q=http%3A%2F%2Fdocs.python.org%2Ftutorial%2Fintroduction.html&sa=D&sntz=1&usg=AFQjCNESijlw5I-wQxxXQ7IKIf0qDP8Ykw)
* Hello world
* Count from 1 to 100
* Count even numbers
* Input name
  + If name has more then N letters, say “What a long name”
* Prime numbers
* Number quiz (“What is 5 \* 3 ?”)
* Optional: Try to have a simple conversation program

**Afternoon**:

Talk about Systems

- What is system?

- Differences between Natural and Built Systems

Natural

- “compost” (efficient recycling and reuse)

- efficient design, multi-use, very little waste

- evolution (what doesn’t work doesn’t reproduce, lots of trials)

- simple, don’t waste energy

(some examples - flowers that look like bees, what else?)

- Not linear (no straight lines)

Built Systems

- Do not reuse, recycle very efficiently, take a lot of energy

- Not always efficient (not really evolutionary process)

- Not always simple

- Usually linear

- Complex systems

- Centralized vs. De-centralized

- Made of many parts, following simple “micro” rules

- Emergence of intereresting large-scale behavior

- Think of examples:

music, crowd behavior, weather, clouds, economy, flock of birds

Netlogo

* Cellular Automata
  + [http://ccl.northwestern.edu/netlogo/models/run.cgi?Life.725.476](http://www.google.com/url?q=http%3A%2F%2Fccl.northwestern.edu%2Fnetlogo%2Fmodels%2Frun.cgi%3FLife.725.476&sa=D&sntz=1&usg=AFQjCNHR-igVXxCJ4utGzjvyWtCp2YMK8g)
* Flocking
  + [http://ccl.northwestern.edu/netlogo/models/run.cgi?Flocking.783.569](http://www.google.com/url?q=http%3A%2F%2Fccl.northwestern.edu%2Fnetlogo%2Fmodels%2Frun.cgi%3FFlocking.783.569&sa=D&sntz=1&usg=AFQjCNHDAvdVsV7OZ0kzNP9F0iITbz9rrg)
* Sand
* Rope
* Segregation
* Gaslab Adiabatic Piston
* Rabbits/Grassweeds
  + [http://ccl.northwestern.edu/netlogo/models/run.cgi?RabbitsGrassWeeds.824.567](http://www.google.com/url?q=http%3A%2F%2Fccl.northwestern.edu%2Fnetlogo%2Fmodels%2Frun.cgi%3FRabbitsGrassWeeds.824.567&sa=D&sntz=1&usg=AFQjCNEgGZBkpk2xyk2NGDORR0VyjN6A1A)

**Late Afternoon:**

Ball harvesting bot

* + Very simple robot (2 on each side)
  + Go out, find ball, push to other side
  + Race other team