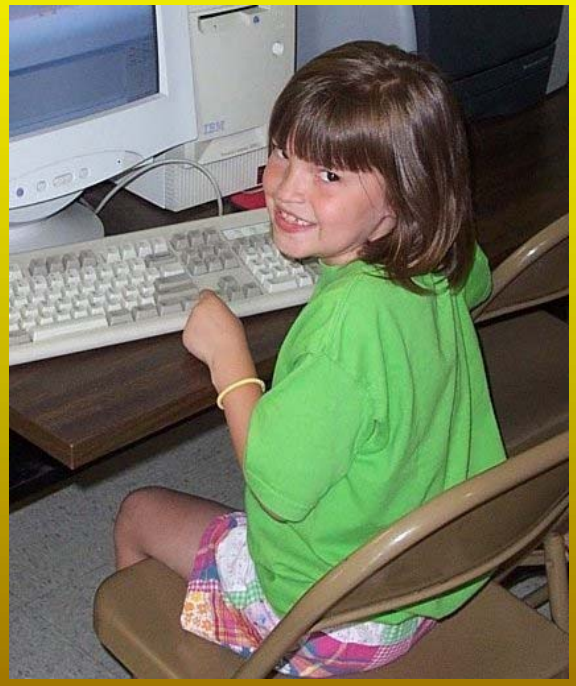
The Six Year Old Hacker:

No More Script Kiddies?



Kevin McCarthy

DefCon 13 30/Jul/2005

A Need Born of Frustration.

- “So what did you do at school today”?
- The problem with computers, (computer based) instruction in elementary schools.
- The Good, The Bad, The Ugly.
- Many schools have well considered “Technology Plans”.
- The absence of a plan usually means drill and kill.

A Need Born of Frustration.

- The Good.
  - Keyboarding
  - Research
  - Document production
- The Bad.
  - Drill and Kill
  - Edutainment

A Need Born of Frustration.

- The Ugly
  - MS Office skills
  - Research
  - Keyboarding

A Need Born of Frustration.

- The Environment
  - Labs
  - Locked Down and Hands Off
- After School
  - Uninformed caretakers.
  - Insufficient supervision.
  - Inappropriate use.

Other Models

- Going old-school on 'em.
- Self taught.
- The spirit of hacking: Doing science in a constructed world.
- Is the elementary school the right place for PCs?

The Plan

"Any subject can be taught effectively in some intellectually honest form to any child at any stage of development."

-JeromeBruner

The Plan

- Programing class
  - 6-11 year olds.
  - Computers aren't just for games, the Web, and boring adult stuff.
  - LOGO
  - The elements of problem solving.
  - Power tripping.

The Plan

- Geek Dojo
  - Open to all ages.
  - Self-selecting
  - Self-motivating
  - Sensie's Challenge.
  - H4x0ring!
  - Cryptography
  - Non-computer related geek stuff.

The Plan

- Summer school.
  - 5 and 6 year-olds.
  - 6-13 year olds.
  - Self-selecting.
  - 2 week, group projects.

The Plan

It's fun to have fun...

The Plan

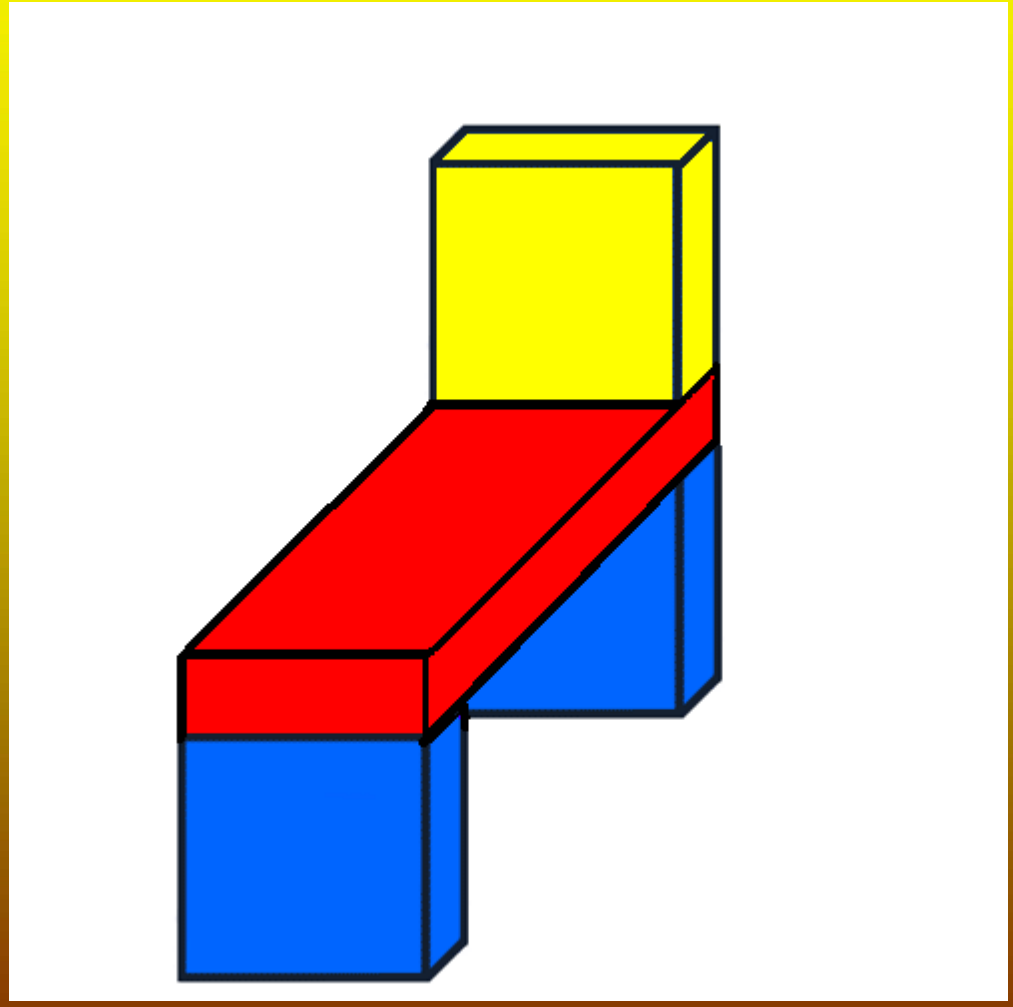
... but you have to know how.

-The Cat in the Hat

Results

- What is a PROGRAM?
- Why do programing?
- No computers the first month.
- *History of computing.*

Results



Results

- LOGO
- Turtle graphics.
- Begin with only relative motion commands.
  - fd *steps == Forward some number of turtle steps.*
  - *rt deg == Right Turn some number of degrees.*
- *Try it first then write a program.*

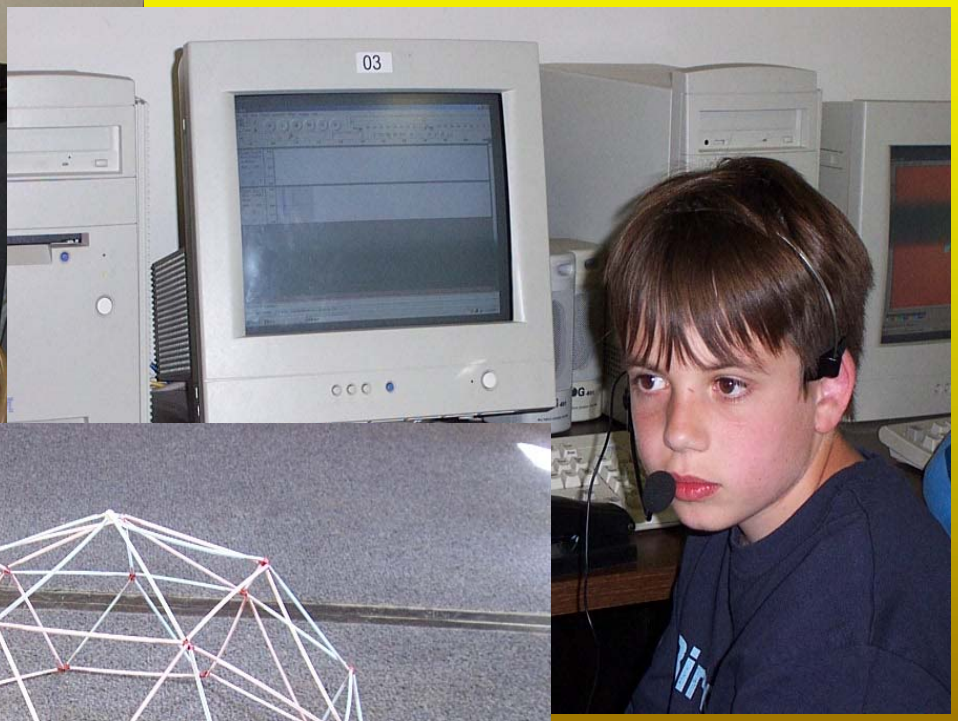
Results

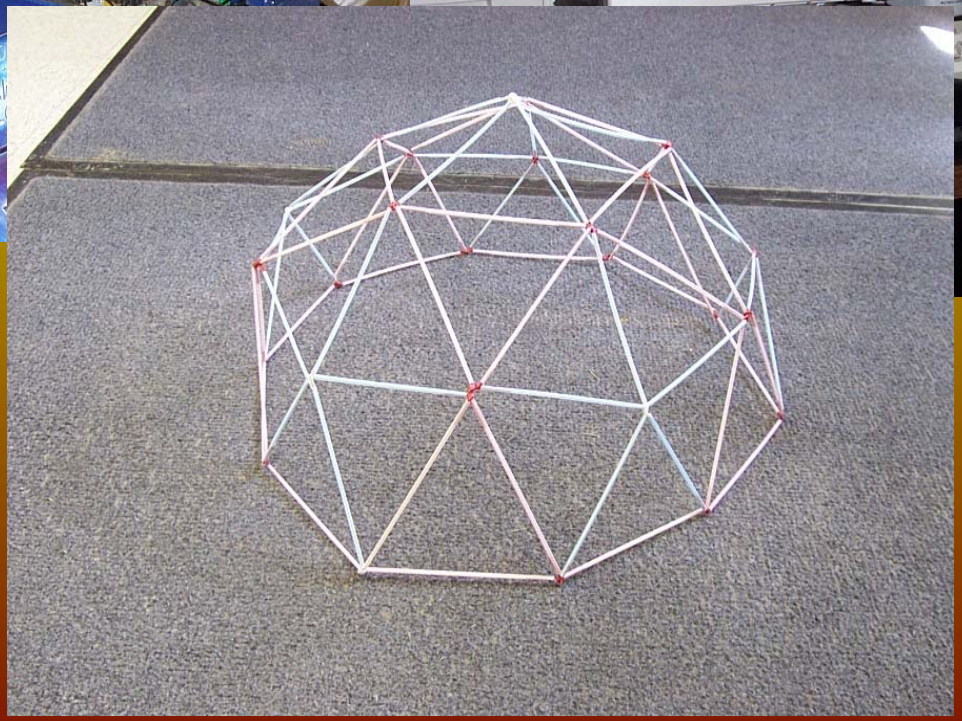
```
to square
fd 100
rt 90
fd 100
rt 90
fd 100
rt 90
fd 100
end

to square
repeate 4 [fd 100 rt 90]
end
```

```
to poly :sides
repeat :sides [
   fd 100 rt 360/:sides
   ]
end

to poly :sides :size
repeat :sides [
   fd :size rt 360/:sides
   ]
end
```

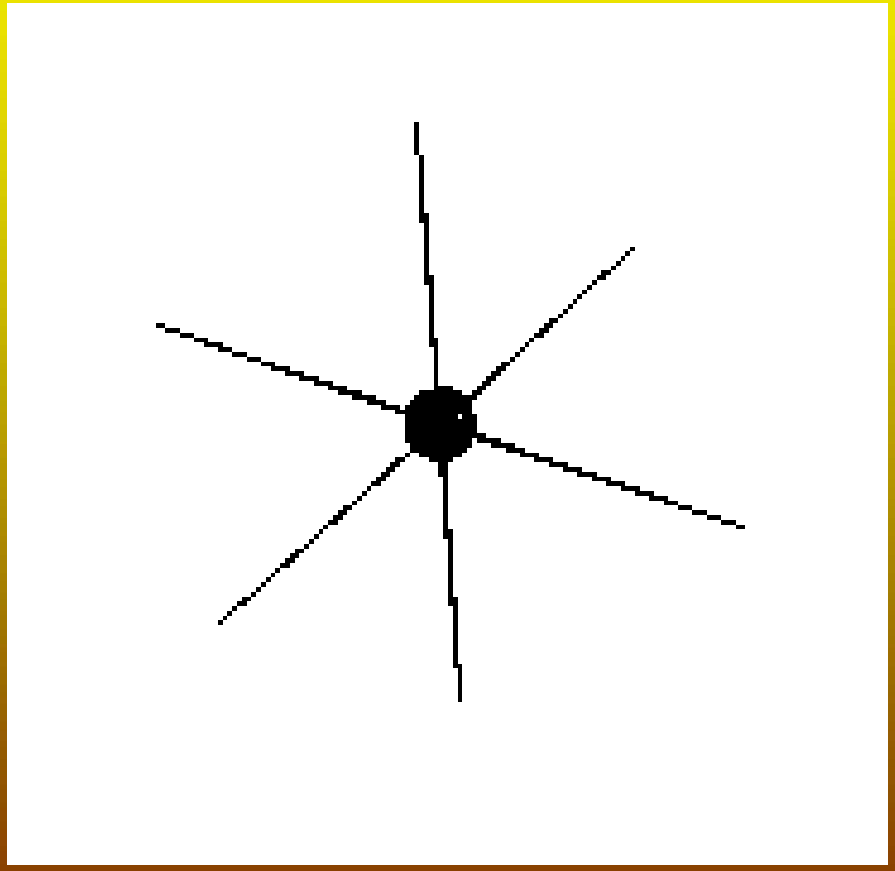
Results

Results



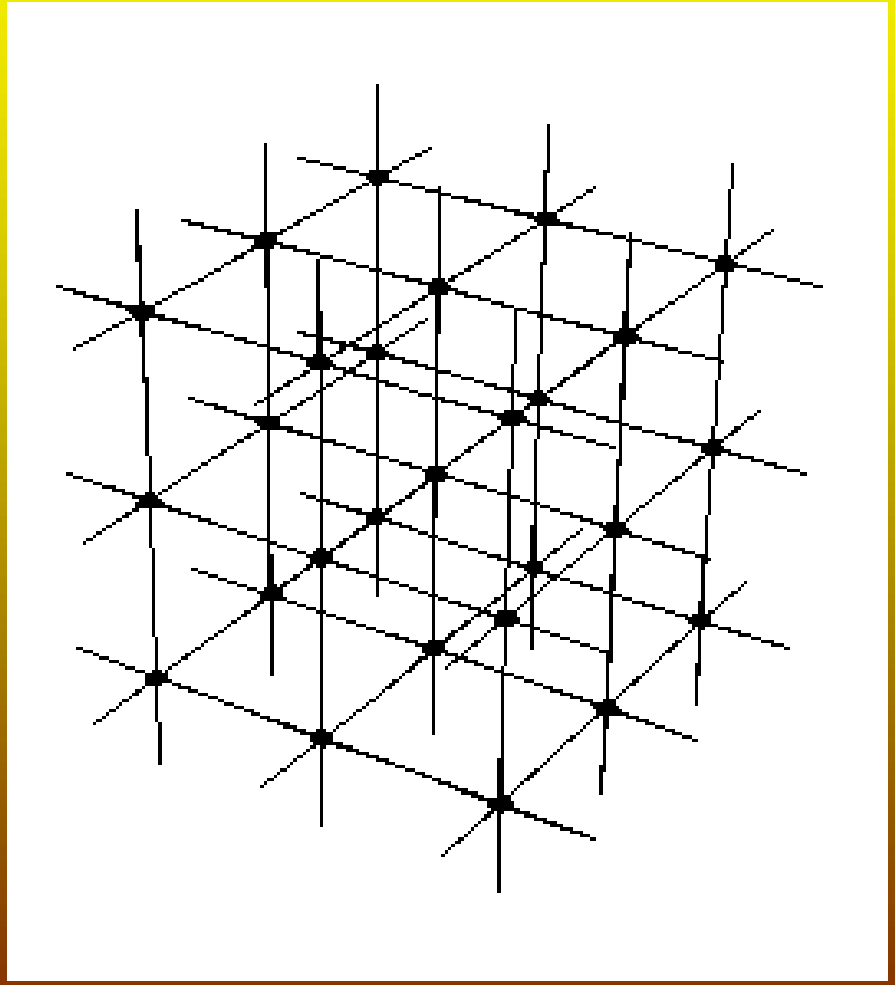


Results



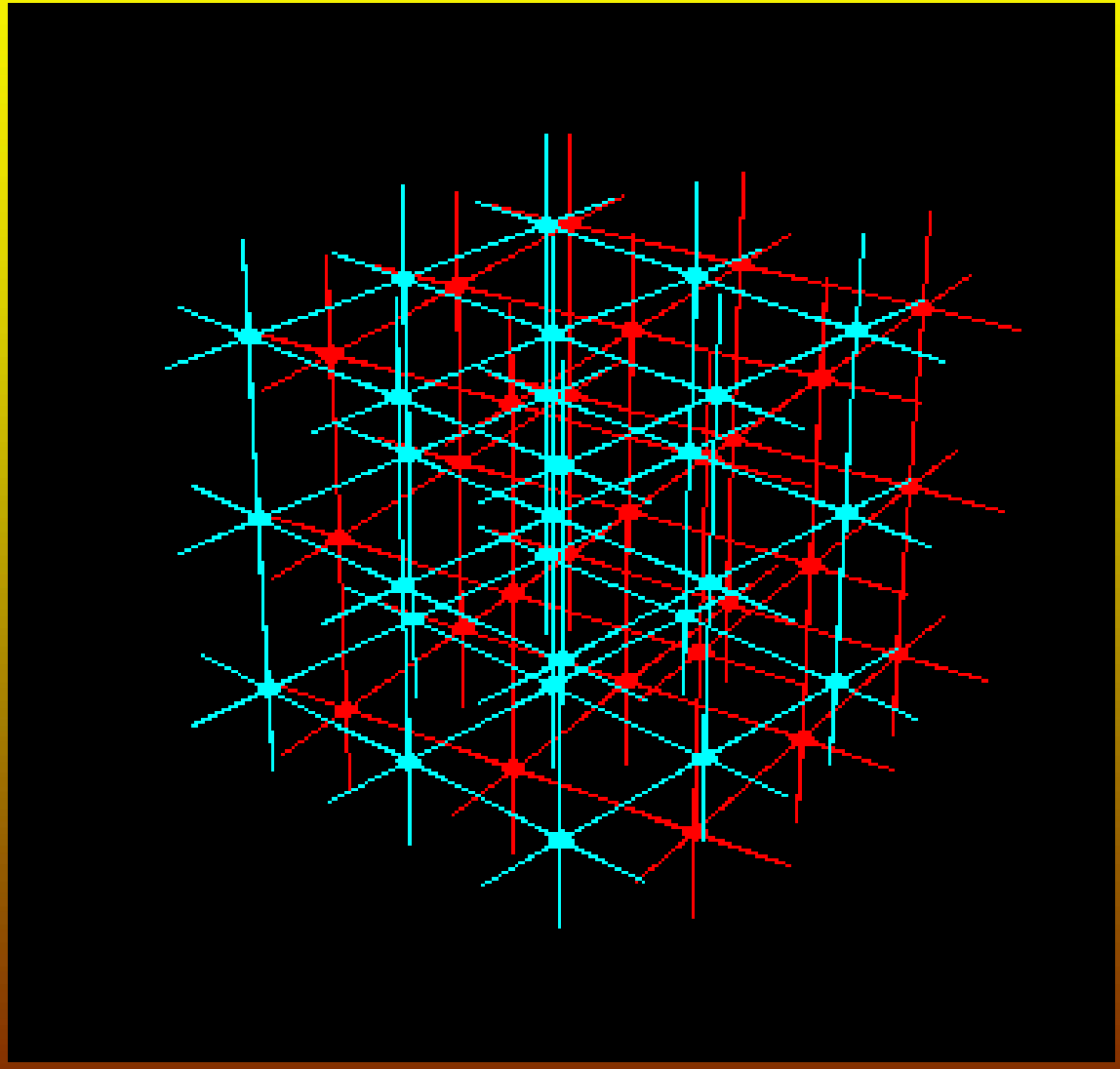
From a basic
Octahedral cell...

Results

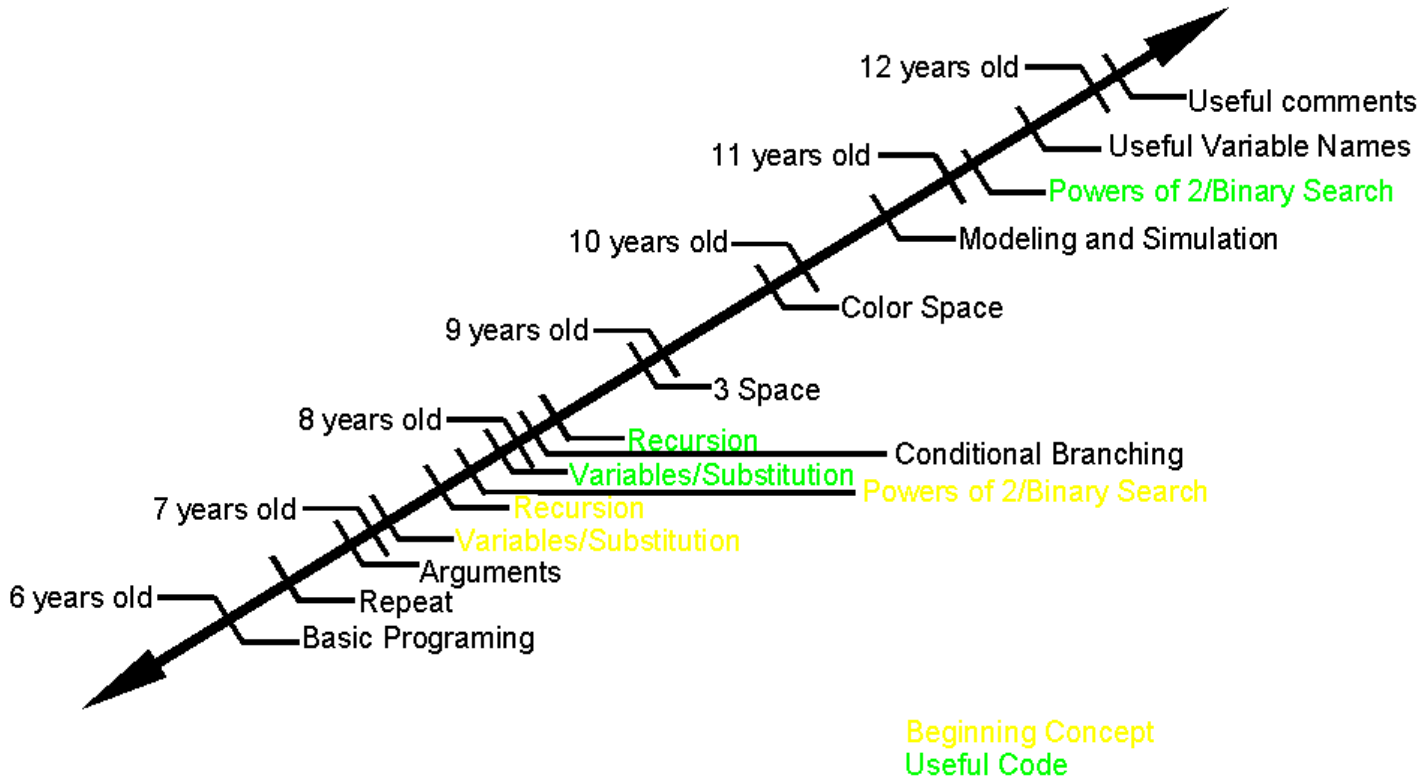


...to a crystal. Or if you prefer...

Results



Results


Skill Acquisition vs. Age
12 years old
Useful comments
Useful Variable Names
11 years old
Powers of 2/Binary Search
Modeling and Simulation
10 years old
Color Space
9 years old
3 Space
8 years old
Recursion
Conditional Branching
Variables/Substitution
Powers of 2/Binary Search
Recursion
7 years old
Variables/Substitution
Arguments
Repeat
6 years old
Basic Programing
Beginning Concept
Useful Code

Results

- Students take responciblity for their own learning.
- Learning becomes self driven.
- Students become intrested in the computing environment of the school.
  - Hardware maintenance.
  - Firewall construction.

Where Now?

This is all basic stuff. So why don't we see more of it?

- How do we expand our reach?
- Public schools?
- Curriculum or no curriculum?
- Independent centers?
- Working with the learning disabled?
  - A real robot turtle.
  - Virtual Turtle in the real world.
- Working with younger hackers?

Props out...

- Diane Thompson, Amelia McCarthy
- Rod and Jane Connell
- Vince Szewczyk, David Kraus
- Maria Montessori, Jean Piaget, Seymour Pappert, Brian Harvey, George Mills