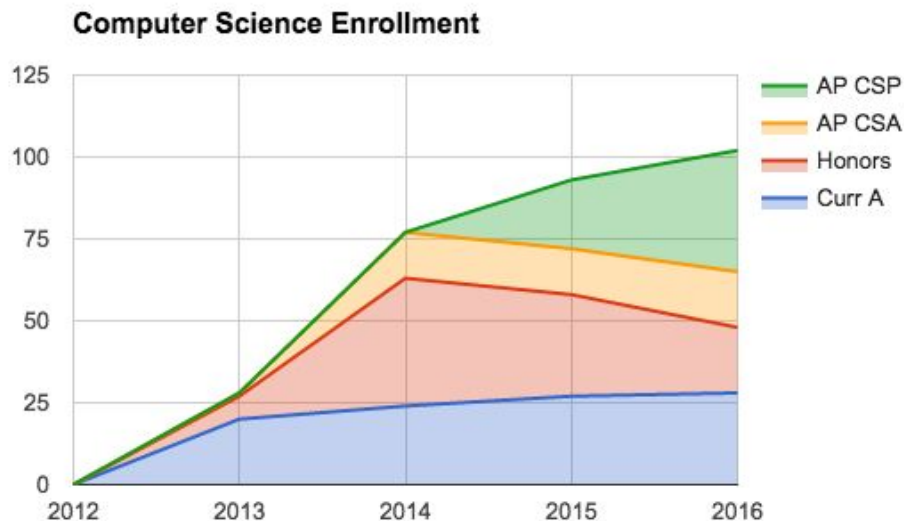# Computer Science at APS

Dan Sheldon, Terry Dash, and Matt Coleman
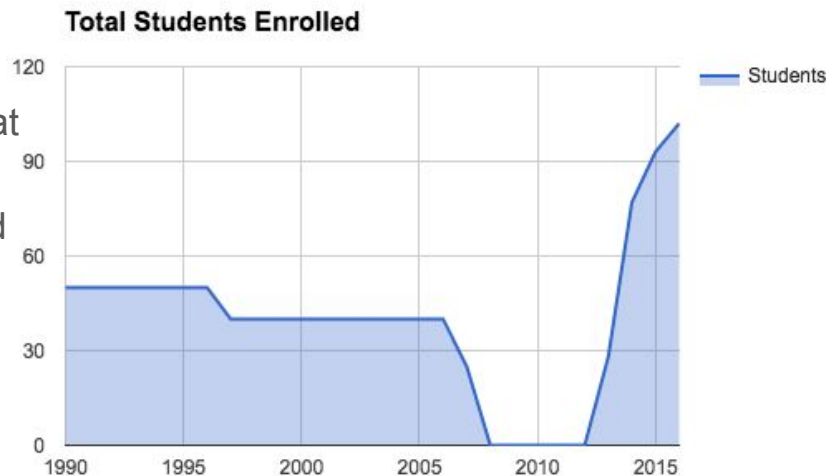
CS At AHS: A Snapshot

Computer Science Enrollment at AHS is Up

- Over 4 Years Have Grown Enrollment From 0 to Over 100 students
  - AP Computer Science Principles Showing Highest Growth
  - Introductory Classes Offered at All Levels
- 4 Classes currently offered
  - Exploring Computer Science (A)
  - Honors Computer Science
  - AP Computer Science Principles
  - AP Computer Science A (Java)

Computer Science Enrollment
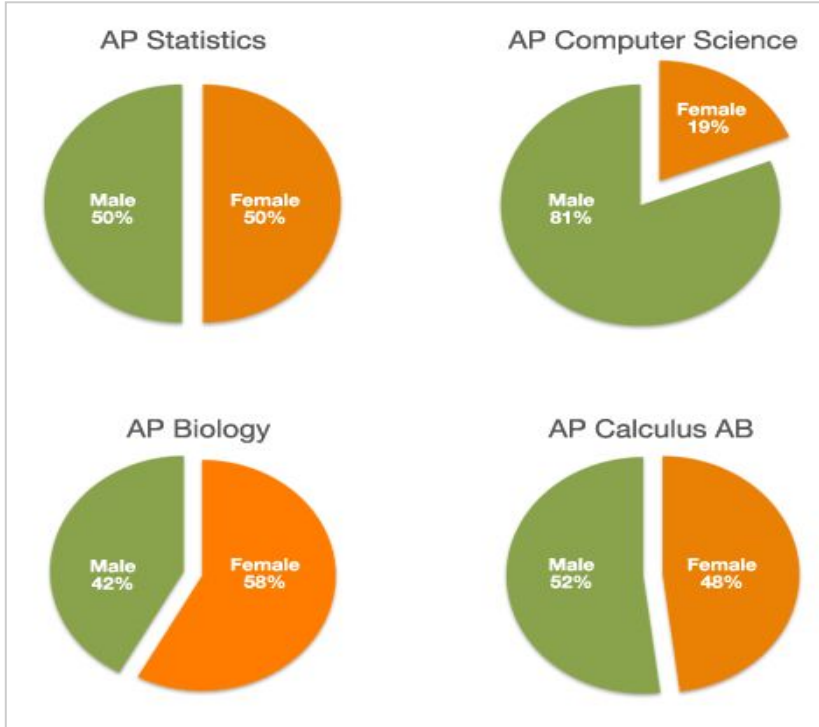
Enrollment is WAY UP

- Computer Science has been at AHS since the 80s
  - There were 3 classes of Computer Science at the Time: A, Honors, AP
  - By 1989 the Computer Science Team placed 5th in the national ACSL Contest
- In 2000, there were still 3 classes of Computer Science
  - In 1994 & 2001, the AHS CS Team again placed in the national ACSL Contest
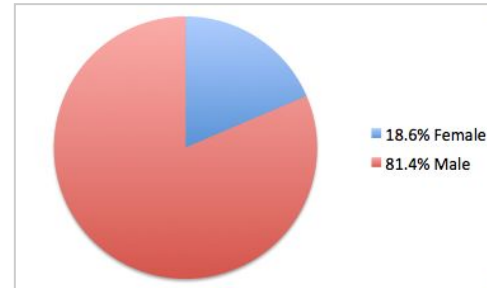 - We have a community that has passion and talent for computer science

Total Students Enrolled

Today we have nearly 100% more students in Computer Science classes than we did during the award winning days

Nationally, not enough Women going into CS

2011 AP Enrollment

2013 AP CS Exam

There is Unbalanced Educational Supply and Demand for Computer Science

- Nine in ten parents want their child to study computer science, but only one in four schools teach computer programming.
- Computing makes up 2/3 of projected new jobs in STEM (Science, Technology, Engineering, and Math).
- Computing occupations are among the highest-paying jobs for new graduates. Yet fewer than 3% of college students graduate with a degree in computer science, and only 8% of STEM graduates are in computer science.
- In 22 states, computer science classes don't count toward math or science high school graduation requirements. (including MA and Arlington)
- Only 22 percent of AP Computer Science students are women. Only 13% are Black/African American or Hispanic/Latino.

Exposure to Computer Science Matters

- Students that take AP CS are 8 times more likely to major in CS.

- In the summer of 2010, Google surveyed a sample of its US employees about exposure to CS prior to college.

  - Nearly all CS majors (98%) reported being exposed to CS prior to college, compared to less than half of non-CS majors (45%). The nature of the exposure varied from reading about CS, after-school programs or camps, to middle or high school CS classes.

  - Those who went on to major in CS were more likely than non-majors to have had a CS class offered in their high school.

  - CS majors were more likely to have known that CS was a possible career path when they were in high school.

Now what? GROW and Customize!

- Introduction to Computer Science At ALL Levels
  - Exploring Computer Science (A)
  - Computer Science Principles (Heterogenous Honors and AP)
- 4 Individual Semesters of Honors Level CS
  - Python and Web Design with JavaScript next year
  - Game Design and Robotics the following year
- Expand the Pool of Teachers Capable of Teaching CS
  - ECS and CSP have free training courses for interested teachers
  - Modern rich curriculum enable experiences teachers to quickly come up to speed to teach CS
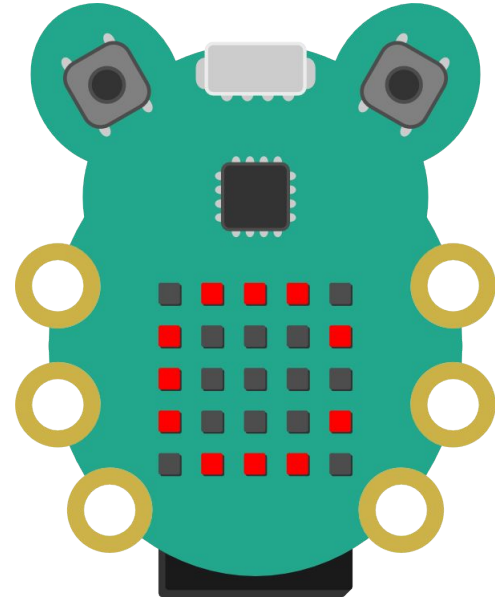
CS @ Middle School

"It is a way to expand your brain and have fun."

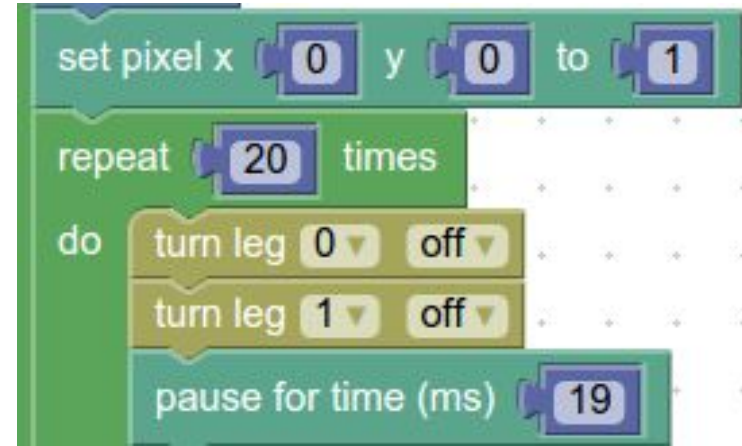# Every other day, all year. Required.

6th Grade

6th Grade Goal

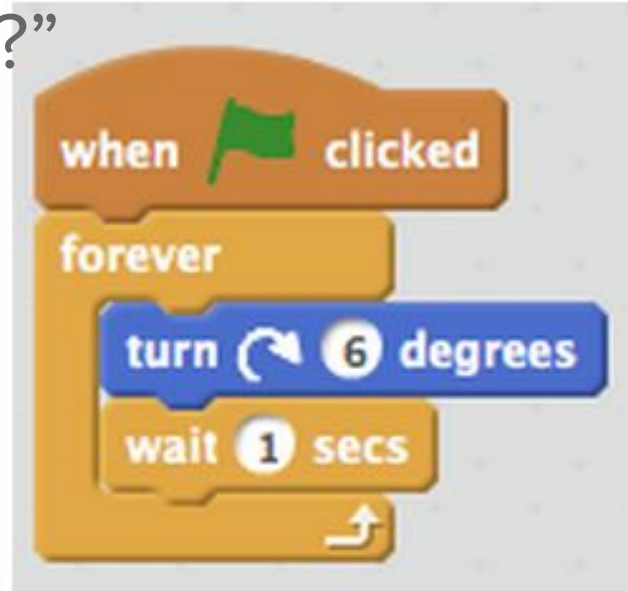- Get kids excited about computer science topics and habits of mind

Topics

- Programming in Scratch, Lightbot, BlocksCAD, CodeBug, and on paper

- How computers & internet work

- Web development

- Safety & ethics

Habits of mind

- Ask: "What am I trying to say?
  Using what vocabulary and grammar?
  How can I organize my thinking?"
- Or, more formally:
  algorithms, decomposition,
  sequential thinking, patterns

Every other day, 1 semester. Elective. Curriculum may change.

8th grade

8th Grade Goal

- Engage kids rigorously:

- Learn formal CS concepts and work more independently.

Topics

- Programming in JavaScript, creating apps, Circuit Playground (?)

- Safety & ethics

```
1  var x = 50;
2  var y = 50;
3
4  fill( ▼ "red");
5  ellipse(x, y); →
6  x = x + 50; //
```

Habits of mind

- All the previous habits plus...

- Abstraction

- Evaluating solutions

```
1  var x = 50;
2  var y = 50;
3
4  fill("red");
5  ellipse(x, y);
6  x = x + 50;  //
7  ellipse(x, y);
8  x = x + 50;  //
9  ellipse(x, y);
```

See the wonderful variety and impressive learning in kids' projects.

Showcase

Websites

Stop Deforestation

What is Deforestation and How Does it Affect Us?

Home

The Mayans

What is Deforestation and How Does it Affect Us?

What is Deforestation and How Does it Affect Us?

Deforestation is mostly a hidden topic. We were all taught that cutting down trees is unhealthy for our planet but, why is it bad and how does it really affect us?

Extensive research has led to a new discovery about the fall of the Mayans and deforestation. Even today the Mayans are still seen as nature friendly, however they're not much better at keeping a clean environment than any other civilization.
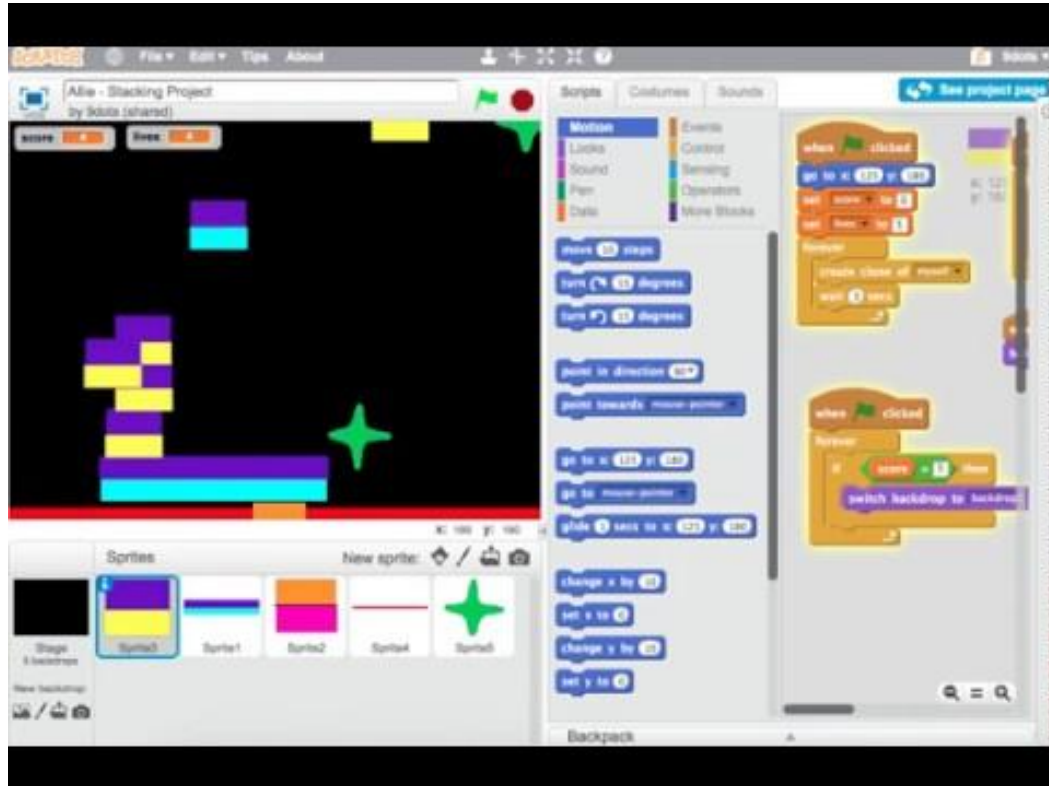
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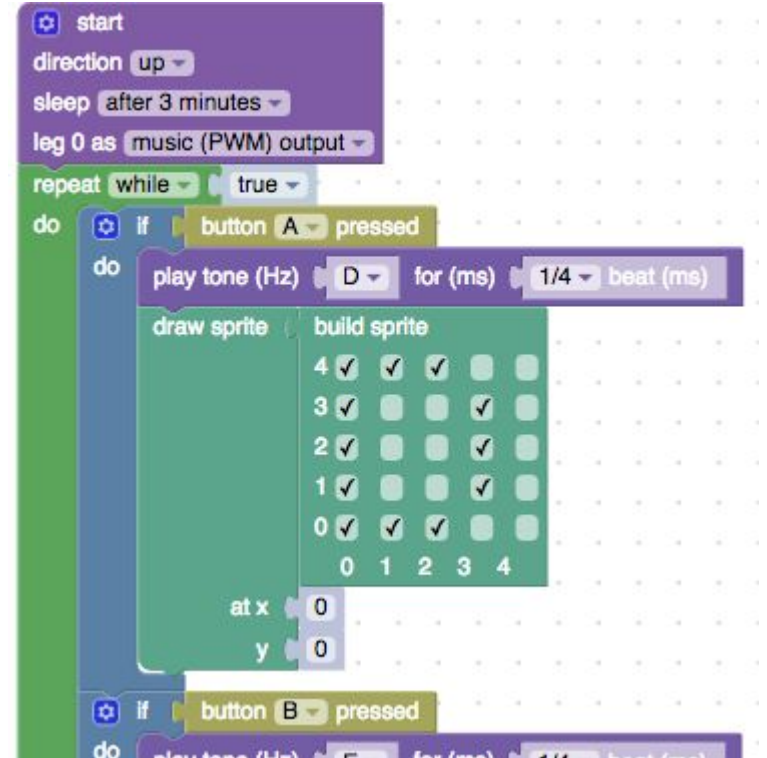# Sprinkles

Ingredients to delicious sweets!!

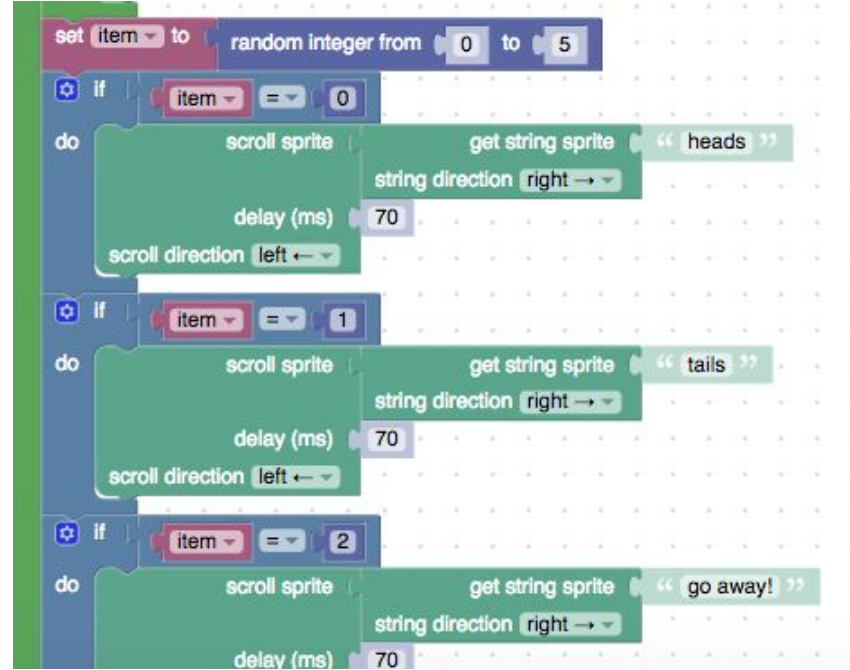# Programming

Allie: Stacking (Scratch, Grade 6)

Declan: Music Watch (CodeBug, Grade 6)

Hannah, Clock (CodeBug, Grade 6)

Theo, Coin Toss (CodeBug, Grade 6)

Ethan & James 1 (Artbotics, Grades 6-8)

Ethan & James 2 (Artbotics, Grade 6-8)

End