PCS edventures!™

IMAGINATION IN EDUCATION

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Welcome!!!!

PCS edventures!™

Code Your Future

Why Programming is Essential in STEM Education

Co-Hosted By:

Randy Jamison
PCS Alumnus & Founder of Curious Media

Robert Grover
CEO PCS Edventures

edventures.com/webinar

October 14th 2015 • 1PM EST

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1 Today's Agenda

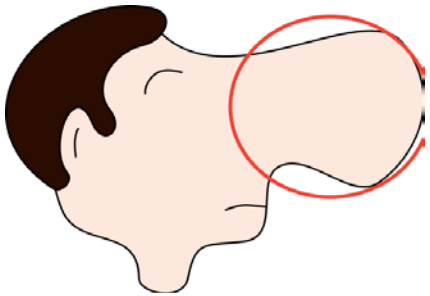
1. Meet Your Hosts!
2. Formative Experiences in Computer Science Education
3. Why Elementary Computer Science
4. What Companies Need and Hire
5. Computer Science Job Statistics
6. Girls and Boys on the Job
7. Girls in STEM and Coding – The Stats
8. Classroom Approaches to Computer Science
9. Resources
10. Lets Talk - Q & A

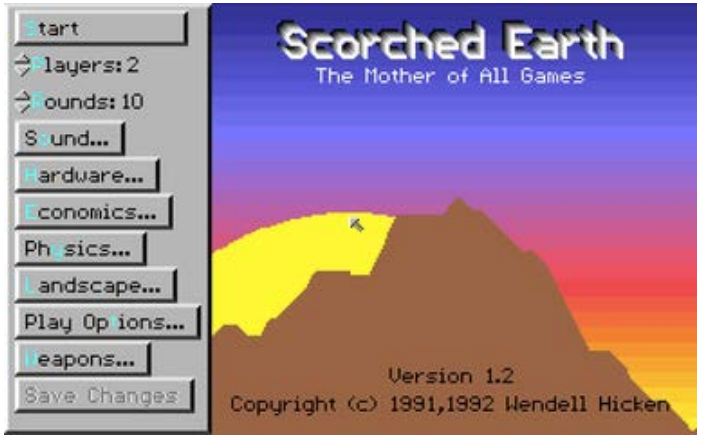
2 Meet Your Hosts!

Randy Jamison
Owner, Curious Media
World Famous Interactive Media Development

Robert Grover
CEO, PCS Edventures
World Famous STEM Education Company

3 Formative Experiences: Fun & Comfort

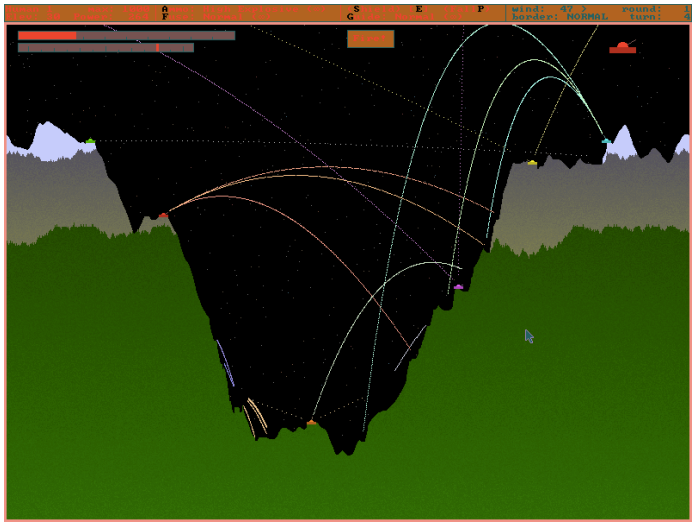




"Having good experiences with computers and being comfortable."

4 Formative Experiences: Math for a Reason!

$$(x+1)(2x-4)\left(\frac{1}{x+1}\right)=(x+1)(2x-4)\left(1-\frac{5}{2x-4}\right)$$
$$2x-4=(x+1)(2x-4)-5(x+1)$$
$$2x-4=2x^2-2x-4-5x-5$$
$$0=2x^2-9x-5$$
$$0=(2x+1)(x-5)$$



algebra.js

```
var expr = new Expression("x");
expr = expr.subtract(3);
expr = expr.add("x");

console.log(expr.toString());
```

```
2x - 3
```

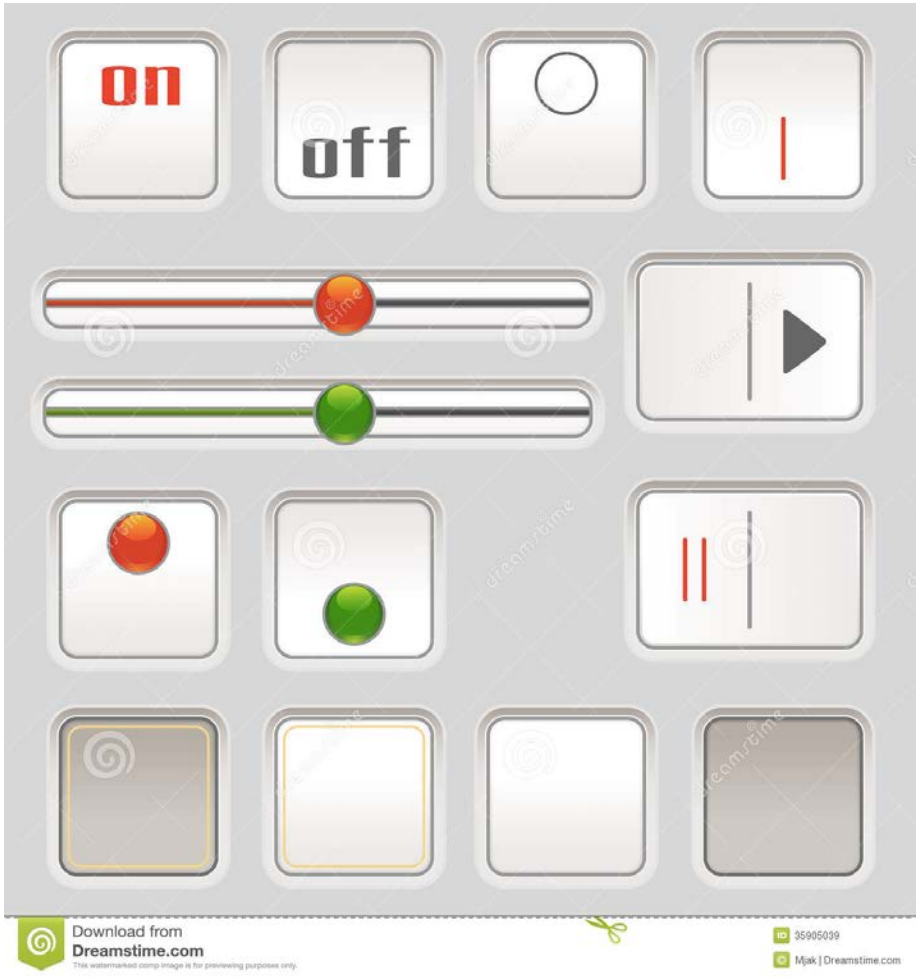
jquery-plugins.net

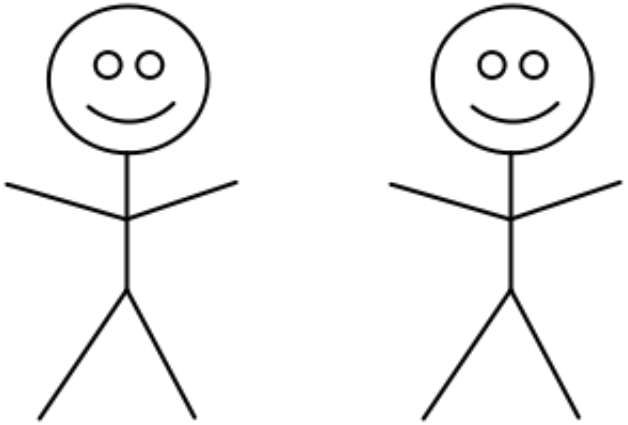
```
var eq = new Equation(expr, 4);

console.log(eq.toString());
```

```
2x - 3 = 4
```

5 Formative Experiences: Interactive? No Way!





"My first interactive animation – something I could control - really lit up my neurons!"

6 Formative Experiences: I can make a living at this?!

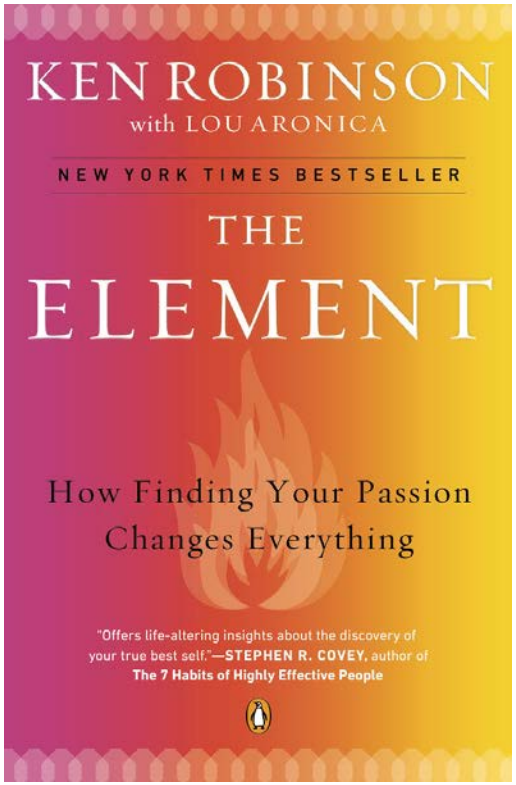
CS Promotes

- Creativity
- Exploration
- Comfort & Awareness
- Problem Solving
- Computational Thinking
- Persistence
- Abstraction
- Applied Mathematics

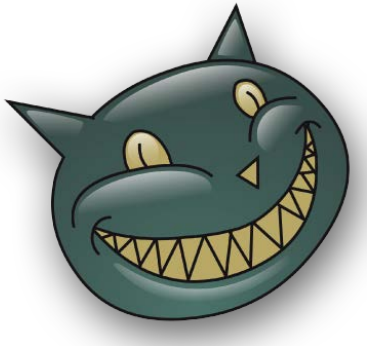
8 What Companies Need and Hire

The Curious Media Recipe

- Talent – not necessarily a degree.
- Passion – something that you truly enjoy.



9 What Companies Need and Hire

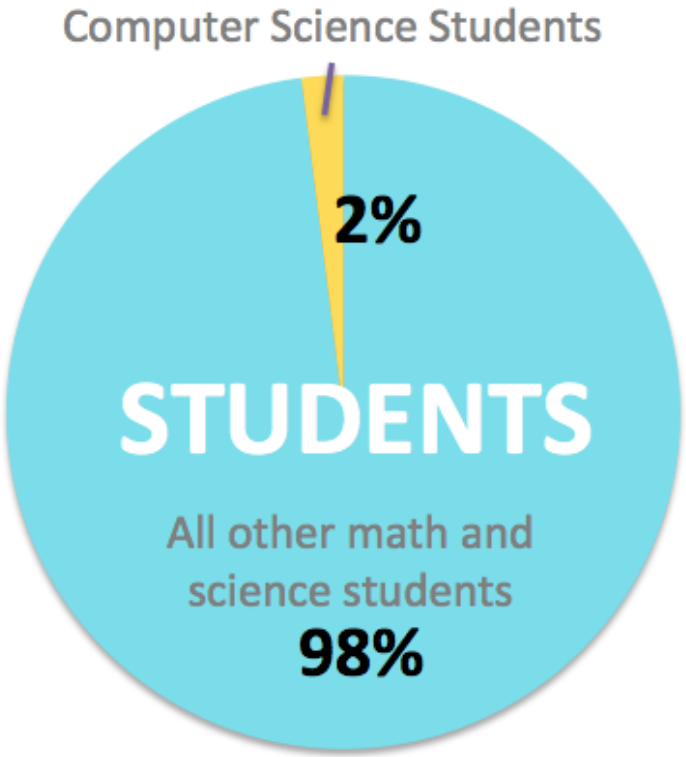


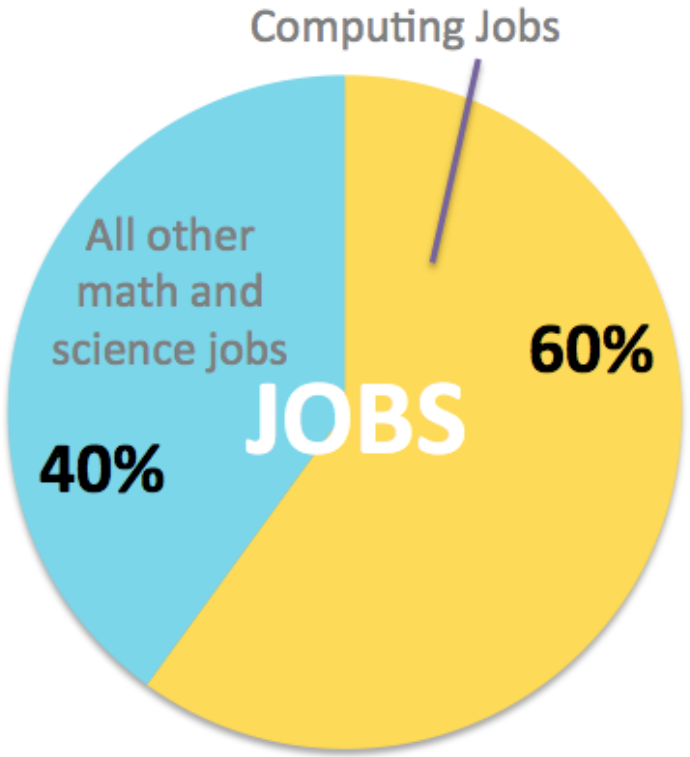
The Curious Media Recipe

- Timeliness
- Clear & Organized Code
- Quality Production
- The Interview – Working Examples

10 CS Job Statistics

The Job/Student Gap



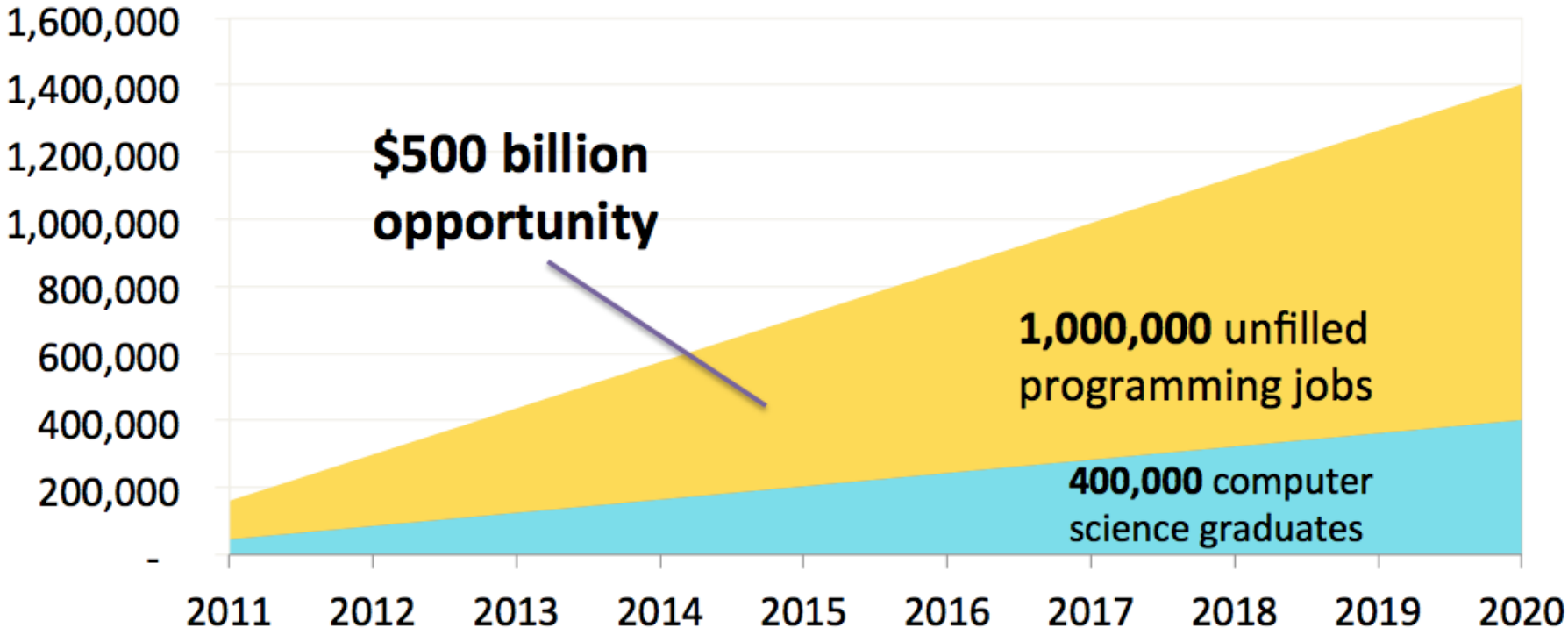


Sources: College Board, Bureau of Labor Statistics, National Science Foundation

From the Code.org Website

11 CS Job Statistics

1,000,000 Unfilled Jobs by 2020



Sources: BLS. NSF. Bav Area Council Economic Institute

From the Code.org Website

12 Girls and Boys on the Job

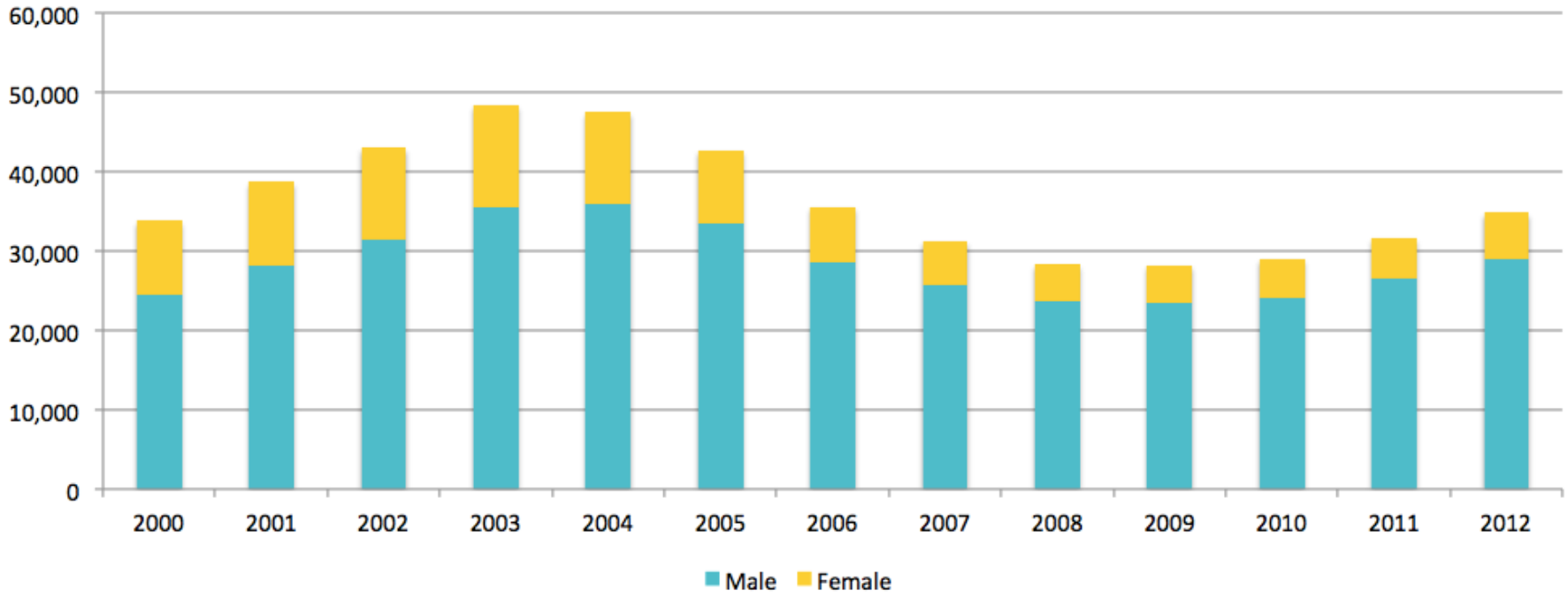
The Curious Media Mix

30 Employees

- 24 Male
- 6 Female

13 Girls and Boys on the Job

Fewer CS majors than 10 years ago
(and a shrinking % are women)



Sources: National Science Foundation

From the Code.org Website

14 Girls and Boys on the Job

How Do We Encourage Girls in STEM?

1. Let girls "play." Math and science should be about experimenting, and learning by doing.

2. Teach girls the history of science, and give context as to why it's so important.

3. Genuinely encourage girls to pursue an education in STEM. ("Ask them, 'Are you taking computer science?'" says Smith.)

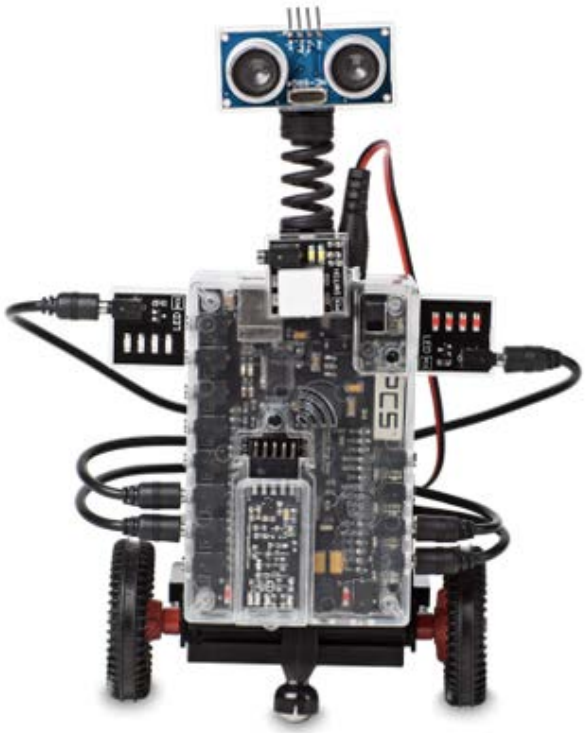
4. Let girls see themselves in the STEM fields by giving examples of women already in these jobs.

-- *Fortune, October 13, 2015*

Megan Smith US CTO

15 CS in the Classroom

Tips for Success



Preparation

- Plan
- Organize
- Test
- Practice

16 CS in the Classroom

Tips for Success
"Engagement"

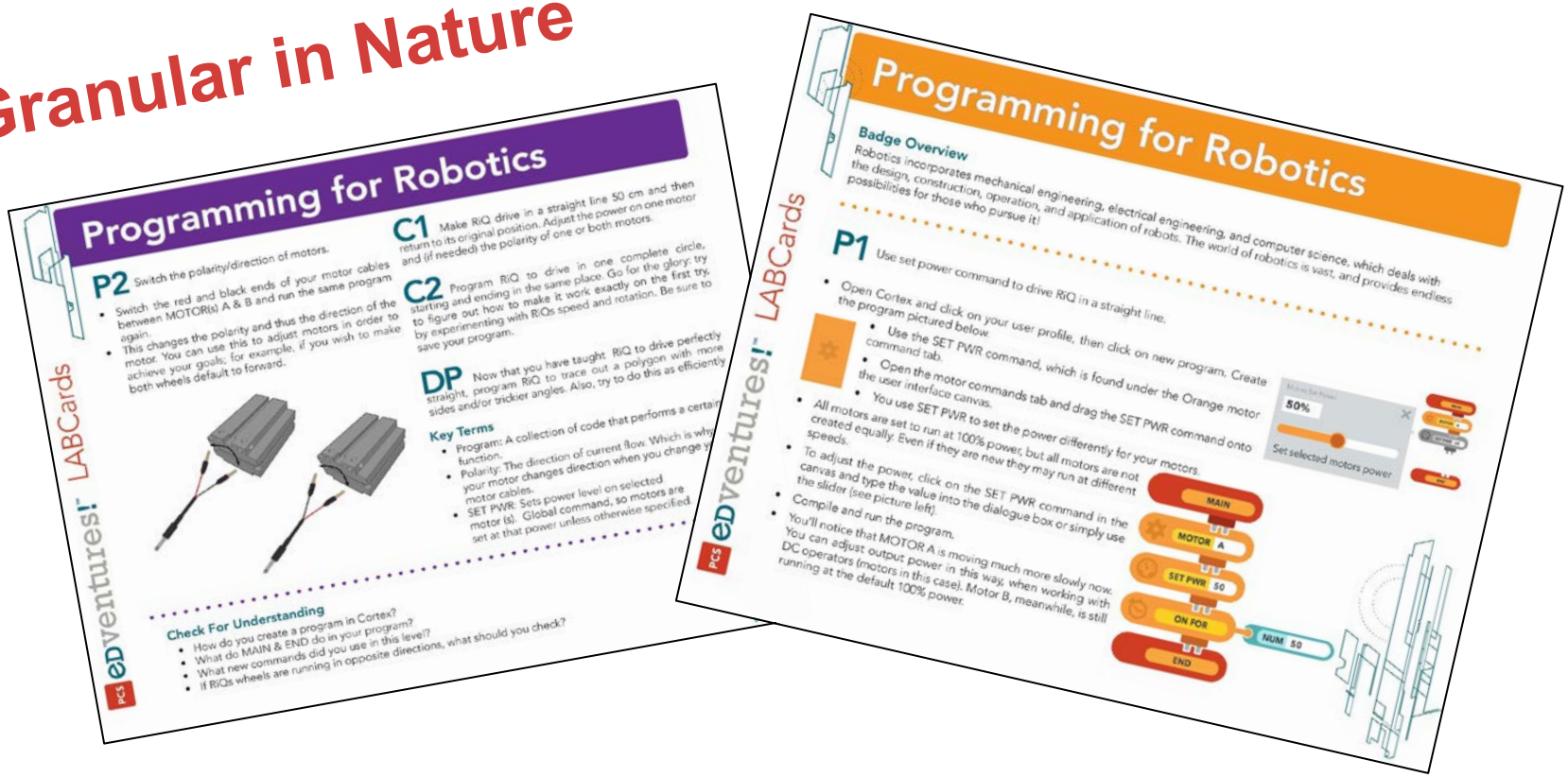
Begin Gently…

- Robotics! → PROGRAMMING
- 3D Design → SKETCHUP
- Multimedia → SCRATCH
- 3D Printing → 3D PRINTING
- Gaming → UNITY

17 CS in the Classroom

PCS Edventures! Approach
LABCards

Granular in Nature



OUTLINE

Programming for Robotics

5 POINTS FOR EDP

PCS eDventures!™ LABCards

Yellow Level Overview

Robotics incorporates mechanical engineering, electrical engineering and computer science - all of which deal with the design, construction, operation and application of robots. The world of robotics is vast and provides endless possibilities!

Robotics Level 1 introduces the hardware used for RiQ including The Brain microcontroller and DC motors. Program The Brain of RiQ using the Cortex programming environment in the following projects. Learn the basics of motor control through an introduction to the language and logic used by computers.

Skills & Learning Objectives

Card 1: — 5 POINTS

RiQ: Introduction to fischertechnik™ and PCS Robotics: The Brain and Cortex

Build with fischertechnik™ manipulatives and start basic programming with The Brain in Cortex software.

Card 2: — 5 POINTS

Cortex, New Project, New User, Save and Bluetooth Connectivity

Create a new project and new user as you write and save your first program.

Card 3: — 5 POINTS

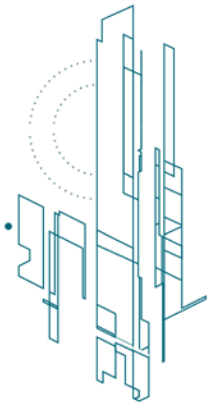
Motor Commands: ON and ON FOR

Learn motor control and adjust the motors on RiQ.

Card 4: — 5 POINTS

Motor Controls: SET PWR and MOTOR polarity

More advanced motor commands are added to your programming skill set.



End Design Project / EDP * — 5 POINTS

Now that you understand basic motor control, demonstrate your mastery by programming RiQ to draw a recognizable shape using the Engineering Design Process; plan your program, test and modify until it works. The only criteria for your drawing is that a peer or instructor can look at the shape and quickly identify it!

** After completing the skills and activities on cards 1-4, return to this final project to test the knowledge you've gained throughout the yellow level.*

19 Resources

PCS Edventures! LABCard Samples

http://edventures.com/pages/curriculum-samples-request-form

Computer Science Teacher's Association
CSTA Standards

http://www.csta.acm.org/Curriculum/sub/K12Standards.html

International Society for Technology Education
ISTE Standards

http://www.iste.org/standards/ISTE-standards/standards-for-computer-science-educators

National Science Foundation
The Future of Computer Science Education

http://www.nsf.gov/news/news_summ.jsp?cntn_id=133577

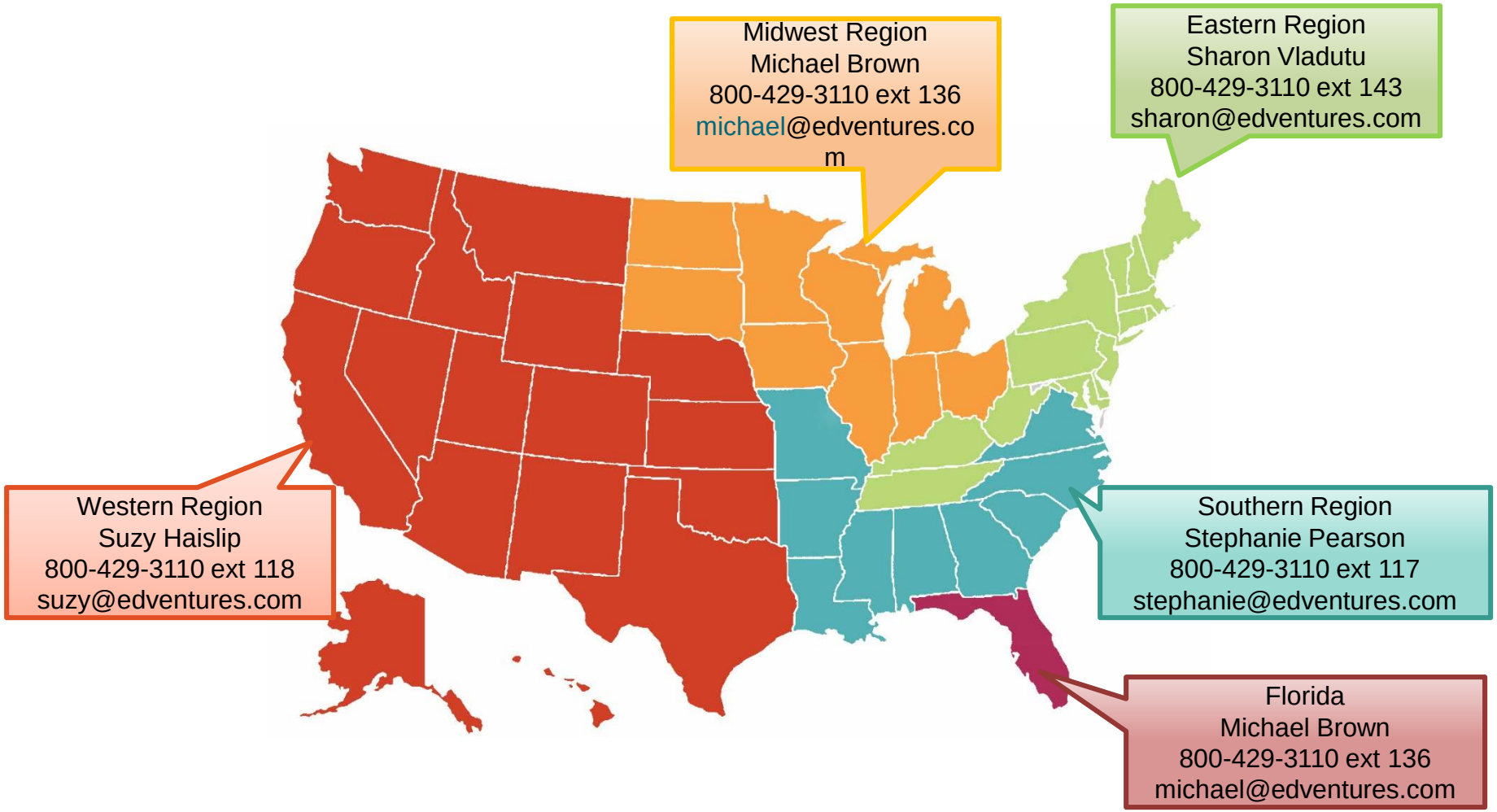
Code.org

http://www.code.org

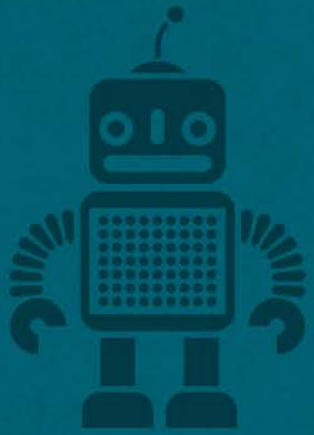
20 Let's Talk - Q & A

Questions?

21 STEM Experts Near You!



Thank you!



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