PATHWAYS TO COMPUTING CAREERS

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PATHWAYS TO COMPUTING CAREERS

Digital Citizens

CS Enabled Specialists

Computing Professionals
Making Sense of Computing for Learning, Living, & Working

COMPUTING CAREERS

TECHNICAL SKILLS/COMPETENCIES

APPLICATION-INTENSIVE SKILLS/COMPETENCIES

Software Users

Digital Citizens

Lifelong Learners

Alter/Change Existing Hardware/Software

Computer Scientists: Hardware/Software
- Solve Problems
- Design new ways to use computers

IT Specialists: Hardware/Software
- Design
- Development
- Support
- Management

CS Careers are focused in this area

ITEST STEM Workforce Education Helix

STEM Content Development Activities
STEM Career Development Activities
Teacher Professional Development
Partnerships
Cultural Context
## CS WORKFORCE DEVELOPMENT OUTCOMES

**Dispositions + Knowledge + Skills = Actions**

<table>
<thead>
<tr>
<th>CS Content</th>
<th>Dispositions What I Think/believe</th>
<th>Knowledge What I know</th>
<th>Skills What I can do</th>
<th>Actions Steps I take</th>
</tr>
</thead>
<tbody>
<tr>
<td>I’m interested in computing and how computers work</td>
<td>I understand the basics of how programs drive computer actions</td>
<td>I am a computational thinker</td>
<td>I am taking an advanced placement course in computer science</td>
<td></td>
</tr>
<tr>
<td>I believe that I can be a computing professional</td>
<td>I am familiar with how computing tools are used by scientists and engineers.</td>
<td>I am able to write a program to solving a real world problem</td>
<td>I seek and obtain a CS internship where I can use my computing skills.</td>
<td></td>
</tr>
</tbody>
</table>
## Data Needed to Demonstrate Progress in CS Workforce Development

<table>
<thead>
<tr>
<th></th>
<th>Dispositions</th>
<th>Knowledge</th>
<th>Skills</th>
<th>Actions</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>What I feel or believe</td>
<td>What I understand</td>
<td>What I can do</td>
<td>Substantial steps I take toward careers</td>
</tr>
<tr>
<td><strong>STEM Content</strong></td>
<td>Data Needed</td>
<td>Data Available</td>
<td>Data Needed</td>
<td>Data Needed</td>
</tr>
<tr>
<td><strong>STEM Careers</strong></td>
<td>Data Available</td>
<td>Data Needed</td>
<td>Data Needed</td>
<td>Data Needed</td>
</tr>
</tbody>
</table>
MASSACHUSETTS PATHWAYS TO COMPUTER SCIENCE AND CS ENABLED CAREERS

Pathways to Computer Science and CS Enabled Careers

Digital Literacy/Computer Science Standards
Equity and Inclusion

Grades in and out of school
K–5
6–8
9–10
11–12

Specialization/Internships

Early Exposure
Concepts Infused Into All Disciplines

Curricula and Tools
• STEM+C
• Code K-5
• Tynker
• Scratch
• Blockly

Exploration
Introductory Courses/Modules

Curricula and Tools
• GUTS
• Bootstrap
• LEGO
• Blockly
• Alice
• Scratch

Engagement and Skills Development

Curricula and Tools
• ECS
• CSP
• Bootstrap
• AgentSheets
• Scratch
• CSP

Pathways to CS Enabled Careers
Engineering
Multimedia/Web Design, e.g.
• Graphic Design, Development
• Web Development
Life Sciences, e.g.:
• Big Data, Bioinformatics

Pathways to CS Careers
CS AP 1
Programming/CS APA, e.g.:
• C++, Python
Software Engineering
Certifications, e.g.:
• Cisco, Microsoft
Computer Engineering

Professional Development for Teachers

School District Community, Education, Business Leader Engagement

*Exploring Computer Science
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LESSONS LEARNED IN DEVELOPING PATHWAYS TO COMPUTING CAREERS

1. Computer Science Education is important. Computing professionals shape the boundaries and limits of discovery and innovation.

2. Computing Careers include Computer Science Enabled Specialists and Computing Professionals.

3. CS Career Development can be guided. Pathways to Computing Careers include developing skills, knowledge and abilities in BOTH STEM+CS Content AND CS Career Content. We need to collect data in all of these areas.