



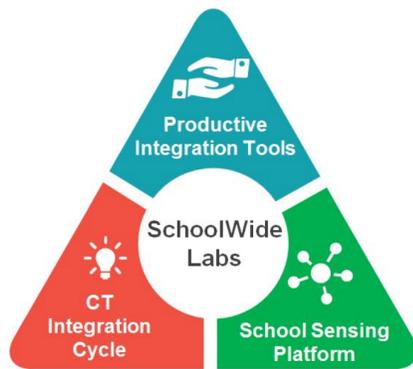
# SchoolWide Labs: Supporting the Integration of Computational Thinking into Middle School Science through Curriculum and Professional Development

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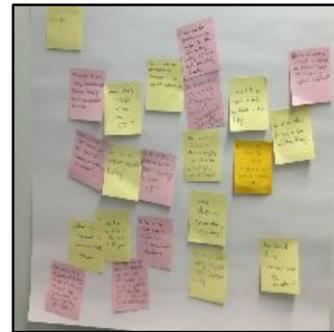


## Professional Development Workshops

### Project Goals



Teachers planning the implementation of the mold unit



Driving Question Board: CT



Teachers using the second version of the sensor system to design a heat resistant phone case

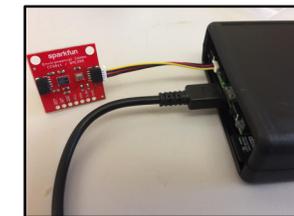
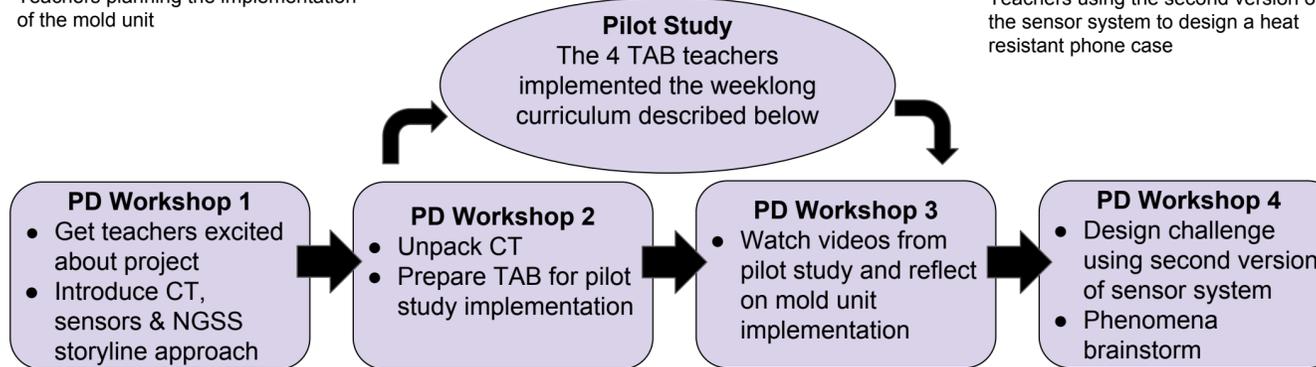
### Lessons Learned from PD Workshops

- TAB ideas about computational thinking expanding, but more work is needed to fully integrate their thinking about computational thinking, data science, and science content
- Excited about possibilities of sensor system version 2
  - See data collected in real time
  - More control over the sensor system
- Finding sensor friendly phenomena aligning with performance expectations in science is challenging

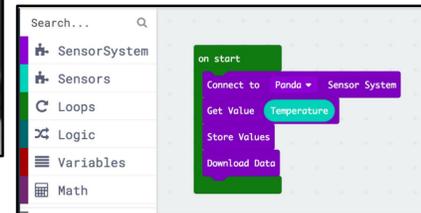
1. Develop professional learning processes and tools to support the integration of computational thinking into middle school science using a sensing platform
2. Deepen students' interest and engagement in computational thinking

### Year One Summary

1. Teacher advisory board (TAB: 4 science/STEM teachers) engaged in
  - Year-long professional development
  - Co-designing a CT-integrated unit
  - Implementing the unit with their students
2. Professional development workshops focused on:
  - Unpacking computational thinking
  - Working with sensors and considering how to introduce them to students
  - Understanding the Next Generation Science Standards
  - Co-designing a storyline that integrated CT into middle school science, using environmental sensors
  - Viewing videos to reflect on instruction, student learning, CT integration, and curriculum development
3. Pilot Study implementation - data collected from teachers & students



Sensor System Version 1: Measures CO<sub>2</sub>, Humidity, Temperature, Pressure, Altitude and total VOCs.



Interface for controlling Sensor System Version 2.

### Pilot Study: Can Mold Grow in Our School?

#### Methods / Data collection

- Spring 2018 over 5 days
- 4 Teachers: Grades 5-8
- 270 Students
- Data: Video, observations, teacher and student interviews, **student exit tickets (SEETs)**

Brief online surveys that capture students' classroom experience over time related to

- Coherence
- Relevance
- General Experience



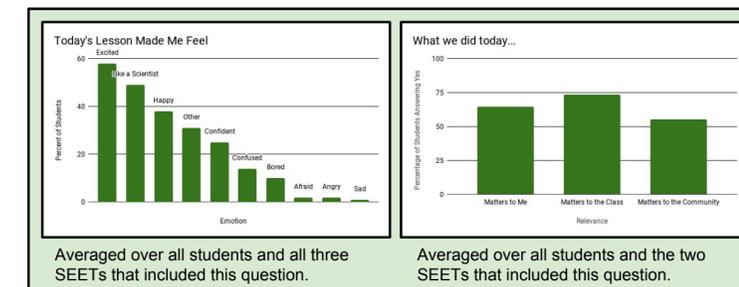
Students creating visualization of the sensor data

Day 1	<b>Mold can close schools</b> <ul style="list-style-type: none"> <li>• Watch video about mold shutting down a school</li> <li>• Generate driving question board about mold</li> </ul>
Day 2	<b>Learn about mold</b> <ul style="list-style-type: none"> <li>• Read case studies to determine what mold needs to grow</li> </ul>
Day 3	<b>Design investigation to look for mold in our school</b> <ul style="list-style-type: none"> <li>• Use knowledge learned in day 2 and sensors</li> </ul>
Day 4	<b>Analyze data to make an argument for/against the potential for mold growth in our school</b> <ul style="list-style-type: none"> <li>• Analyze the data collected to answer the question: Could mold grow here?</li> </ul>
Day 5	<b>Share results with class</b> <ul style="list-style-type: none"> <li>• Share results to determine where mold is most likely to grow in our school</li> </ul>



Students developing a driving question board based on the mold storyline investigation.

### Lessons Learned from Pilot Study



Averaged over all students and all three SEETs that included this question.

Averaged over all students and the two SEETs that included this question.

- TAB successfully implemented mold unit
- Students interested and engaged throughout the implementation
- Data analysis was cut short
  - The curriculum needs to be longer than five days
- Sensor use limited to one day
  - Integrate sensors throughout the unit (potentially through design challenges)

### Acknowledgements

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