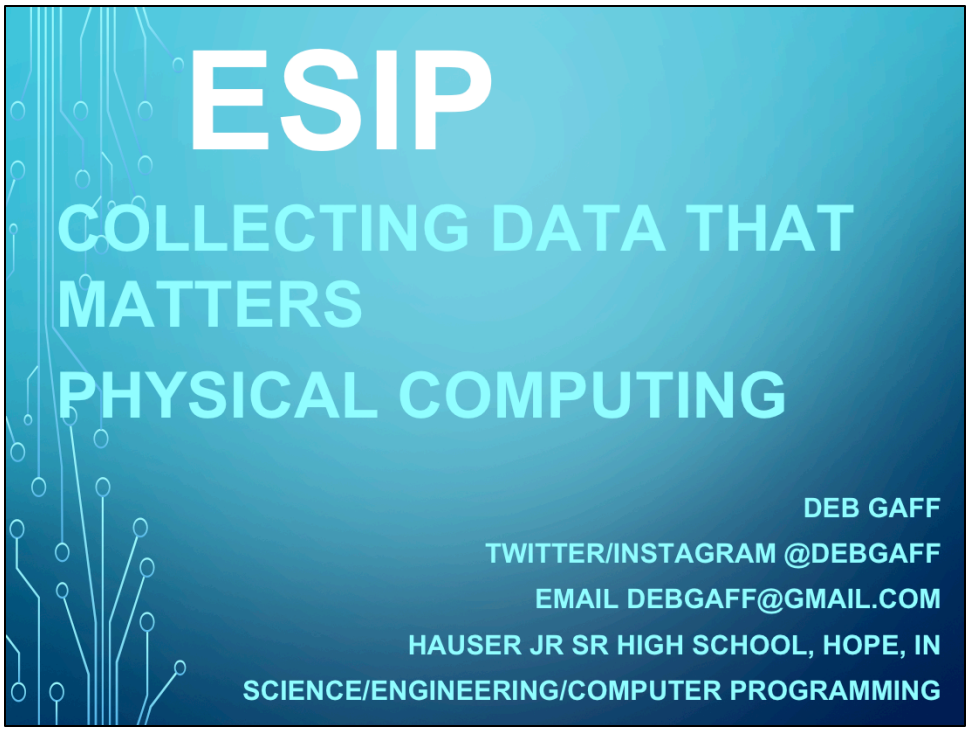
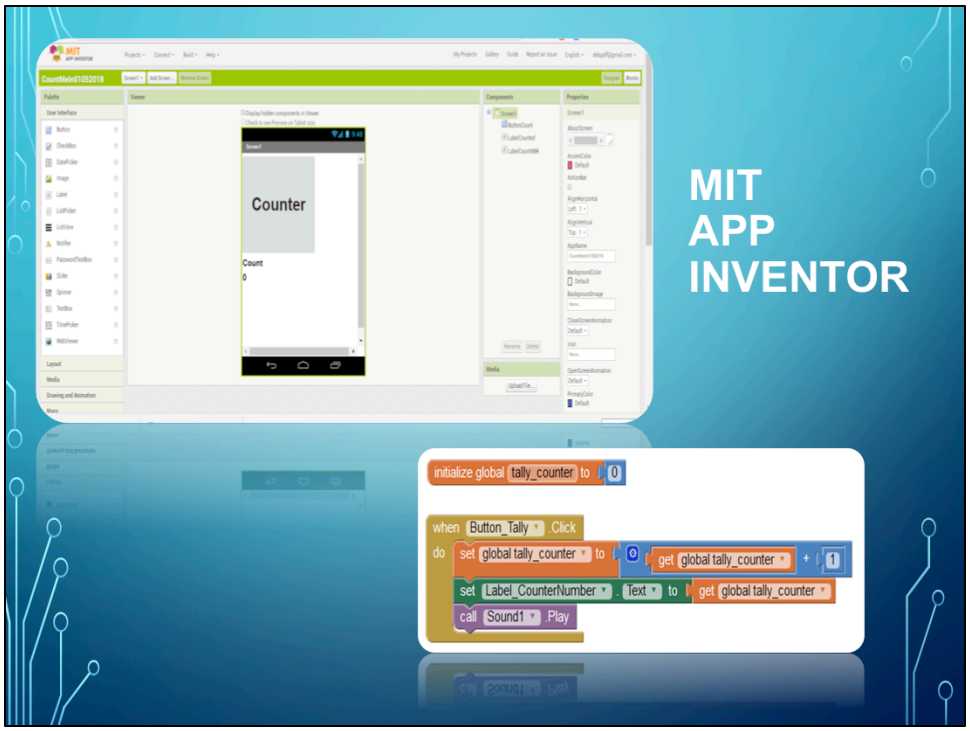


Teaching is my second career. I have worked as a computer programmer for 22 years before transitioning to teaching in 2002. Hope, Indiana is a small rural town in south central Indiana. Our corporation has about 800 students.



I like to begin my Introduction to Computer Programming class with MIT App Inventor. Students are familiar with Apps and excited to make one of their own. The block coding allows students to focus on process and not syntax. We can learn basic computational thinking without making coding errors.

The nature of MIT App Inventor is a visual coding environment and the feedback is immediate, This keeps student interest high and encourages them to make changes and take risks.

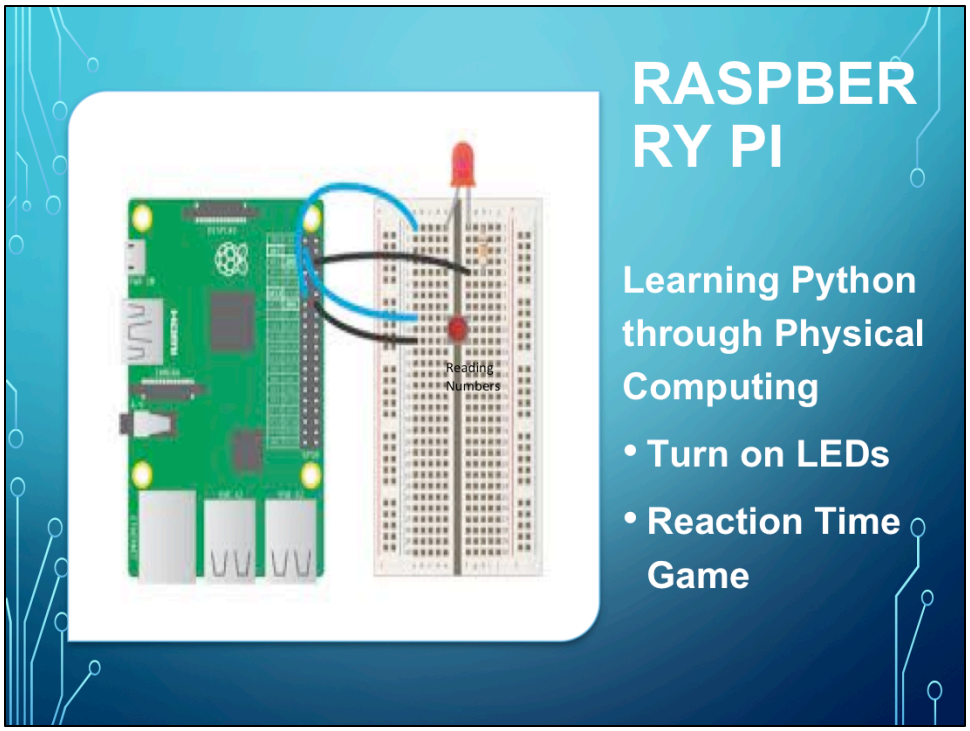
The first project is an App for retailers who must take inventor. We add a button and the total count. Students experience immediate satisfaction when they test their app.

Next we discuss what makes an app appealing and successful and decide that our app could use a few enhancements. We make a list - color, images, sound when the button is pressed, reset button, subtract button and so on.

Students select 4 enhancements from the list that they will implement. I remind them to make only one change at a time and test it so if there is a problem and the app no longer works, they can focus on the code we just created.

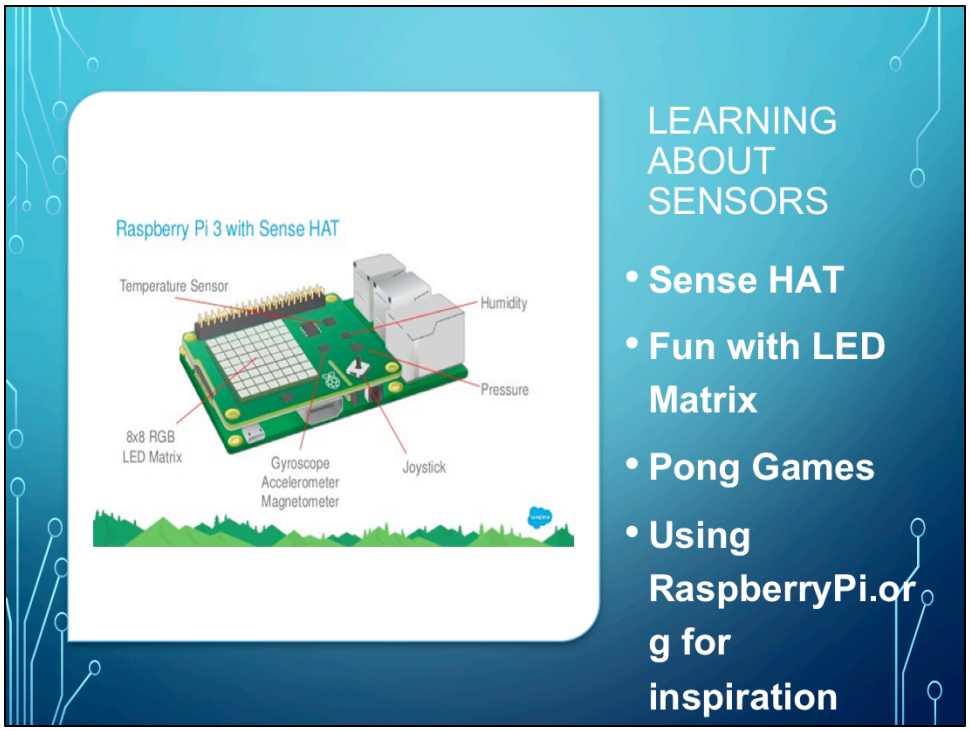
I make sure the client projects we work on from this point on will give students the experience with a variety of coding options.

We spend two weeks working with Spheros and Ollies using Sphero Edu. The Sphero Edu site https://edu.sphero.com/cwists/category has some great lesson examples Ss learn to collect data as they program the Spheros and Ollies. We continue to focus on computational thinking. When Ss code their device to make a 100cm square they code each side and turn. I then challenge them to reduce the code to three lines. This helps them look for patterns and work with loops. I also setup mazes and other challenge course where they have to calculate angles and distances. I like to take advantage of integrating math whenever possible so Ss see what they are learning applies across the curriculum

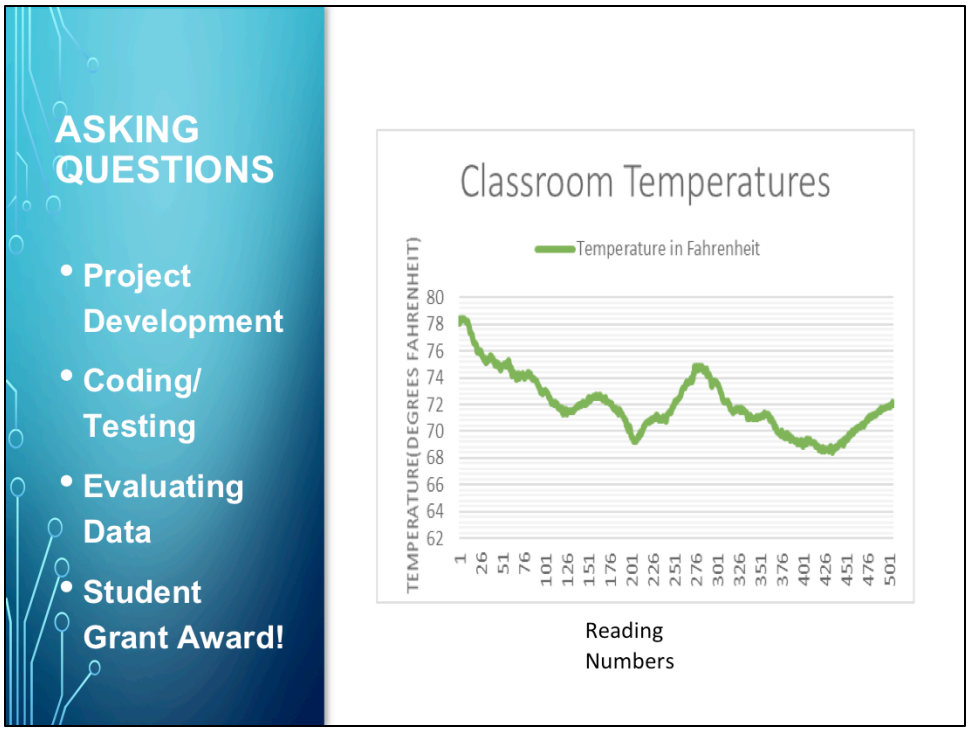


The second 9 weeks of the semester, we learn Python, a text-based language. Ss learn to connect a breadboard to the Raspberry Pi GPIO and code a short program to turn on an LED.

Next we add a button and turn on the LED randomly. Ss program the button to turn off the light and record their response time. Ss are excited about these little programs as they see their code make something happen.



We add the Sense Hat to the Raspberyy Pi. Ss code emojis to display on the LED Matrix. https://www.raspberrypi.org/ has some great tutorials that guide Ss while not giving them a cut and paste opportunity. Check out the Pong Game https://twitter.com/debgaff/status/925830620437204998



Ss are challenged to propose a project to gather data using the Raspberry Pi and sensors. Once their project is approved, they design, code, test, collect and evaluate data. This student stated that the classrooms were all different temperatures. She attached a power supply to her Raspberry Pi, wrote a program to create a CSV file of temperature readings every second as she walked through the building. She proved that indeed temperatures vary as much as 10 degrees throughout the school. This graph prompted her and her classmates to ask a plethora of additional questions - so she is going to run the program again and record the exact locations.

She also wants to run the program on days when the outside temperature is warmer or colder that this run to see if the temperatures change. Inspired by her work in this class, she also wrote a grant proposal for the Indiana Academy of Science to purchase materials a Raspberry Pi and materials to create a home weather station. She was awarded the grant and is working on that

We are purchasing a few drones. We hope to replace the on-board camera with a Raspberry Pi zero and a camera coded to take photos at one second intervals. Out 8th graders plant a garden in the spring and we will fly over regularly to create a video.

We also hope to create Raspberry Pi powered autonomous robots.

We have be in contact with local engineering firms and manufacturers where they are also working with Raspberry Pi and sensors. Representatives will be visiting our classroom.