Bay County Scientist in Residence Project
Lesson Plan

Session 4: Monday, March 13 (1-4 PM central)

Topic: Arduino & Coding
Materials Needed: Arduino Genuino IDE software and driver pre-loaded on laptops; robot code for Arduino; pre-assembled robots.

Learning Objectives for Arduino and Coding (from grant application):

1. Students will be able to demonstrate basic coding skills and will know where to find coding resources to answer questions.
2. Students will be able to explain the Hour of Code and Girls Who Code movements and how to get involved.
3. Students will be able to describe the basic functioning of an Arduino microcontroller board.
4. Students can demonstrate how to configure an Arduino to communicate with hardware.
5. Students will be able to define the terms code, Arduino, microcontroller board, robot, voltage, current, motor and sensor.
6. Students will be able to build and operate a basic robot.

Assignments to be completed BEFORE this class:

- View the following websites and be able to answer the following questions:
    - https://code.org/
        - What is the mission of Code.org?
        - What is Hour of Code and how does a person participate?
    - https://girlswhocode.com/
        - What is the mission of Girls Who Code?
        - Where are clubs located and how can a person get involved?

Class Outline:

- Students will review the Arduino robot code and discuss some of the basic attributes, such as the difference between set up and loop code, variable types, and analog vs. digital.
- The Scientist in Residence will demonstrate how changes in the code will change how the robot operates.

Recommended Books on Arduino:

- *Exploring Arduino: Tools and Techniques for Engineering Wizardry* by Jeremy Blum
- *Programming Arduino: Getting Started with Sketches* by Simon Monk
- *Programming Arduino: Going Further with Sketches* by Simon Monk

Post-class Assignments:

- Post something on the Florida Panhandle STEM Programming Facebook page. This can include photos from class, questions, observations or comments. Participants are also encouraged to post on their organization's Facebook page.
- View these videos, recommended by our Scientist in Residence, if you have time. Pause the video in places to look at the code. Also, the code is available on the website below the video. Copy and paste it into your IDE and play with it.
    - These 2 emphasize DIGITAL input and output:
      http://mertarduinotutorial.blogspot.com/2016/11/pushbutton-led.html
      http://mertarduinotutorial.blogspot.com/2016/11/digitalread-button.html
    - This one emphasizes ANALOG input and the serial monitor:
      http://mertarduinotutorial.blogspot.com/2016/11/analogread-potentiometer.html
- Students are encouraged to play with the code and try to make their robot do something different, then post their results on the Facebook page.

Additional Resources:
https://www.arduino.cc/en/Reference/HomePage

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