Bay County Scientist in Residence Project
Lesson Plan

Session 3: Wednesday, March 1 (1-4 PM central)

Topic: Arduino IDE, Coding & Robot Assembly
Materials Needed: Arduino Genuino software and driver pre-loaded on laptops; robot code; supplies for assembling robots: Arduino Uno microcontroller board, USB cable, mini breadboard, remote control with infrared receiver, 2 servo motos, conductors (wires), 9V battery, 9V battery clip, 3D printed chassis, 2-3D printed wheels, 4 screws to attach Arduino to chassis, small phillips head screwdriver.

Learning Objectives for the remaining sessions (from grant application):

1. Students will be able to select a model from the sharing site Thingiverse and print it on a 3D printer.
2. Students will be able to use software to create a 3D design with multiple parts, print it on a 3D printer and assemble the parts.
3. Students will be able to demonstrate how to use a 3D printer, including how to change filament reels and troubleshoot common technical problems.
4. Students will be able to discuss the legal, intellectual property, and environmental issues related to 3D printing.
5. Students will be able to demonstrate basic coding skills and will know where to find coding resources to answer questions.
6. Students will be able to explain the Hour of Code and Girls Who Code movements and how to get involved.
7. Students will be able to describe the basic functioning of an Arduino microcontroller board.
8. Students can demonstrate how to configure an Arduino to communicate with hardware.
9. Students will be able to define the terms code, Arduino, microcontroller board, robot, voltage, current, motor and sensor.
10. Students will be able to build and operate a basic robot.

Assignments to be completed BEFORE this class:

- View the videos posted by Jason on the Facebook page about how breadboards work.
    - https://www.youtube.com/watch?v=fq6U5Y14oM4
    - https://www.youtube.com/watch?v=q_Q5s9AhCR0
- Also watch this video about hobby servos, https://youtu.be/uIdEdCDBU-E.
- If you will be bringing your own computer to the next class, please go ahead and install the Arduino IDE. Go to https://www.arduino.cc/en/Main/Software and choose Windows installer (or Mac if that is what you have).

Class Outline:

- Students will receive an Arduino Uno and will test it using the Blink program provided in the Arduino Genuino software.
- Students will load the pre-written robot code onto their Arduino Uno.
- Students will assemble their robot.
- Students will wire their robot and test to ensure it is operating correctly.

Post-class Assignment:

- 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.

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