

## 6-8<sup>th</sup> -Sphero Robots and the Periodic Table

**Description:** *Students will learn the importance of coding and get an introduction to the Periodic Table. During this lab, students will learn the basics of coding the Sphero, and then will demonstrate what they have learned by programming their Sphero across the Periodic Table.*

### Standards:

- **CSS 1B-CS-01** Describe how internal and external parts of computing devices function to form a system. Computing devices often depend on other devices or components. For example, a robot depends on a physically attached light sensor to detect changes in brightness, whereas the light sensor depends on the robot for power. Keyboard input or a mouse click could cause an action to happen or information to be displayed on a screen; this could only happen because the computer has a processor to evaluate what is happening externally and produce corresponding responses. Students should describe how devices and components interact using correct terminology.
- **CSS 1B-CS-02** Model how computer hardware and software work together as a system to accomplish tasks. In order for a person to accomplish tasks with a computer, both hardware and software are needed. At this stage, a model should only include the basic elements of a computer system, such as input, output, processor, sensors, and storage. Students could draw a model on paper or in a drawing program, program an animation to demonstrate it, or demonstrate it by acting this out in some way.
- **CSS 1B-AP-10** Create programs that include sequences, events, loops, and conditionals. Control structures specify the order (sequence) in which instructions are executed within a program and can be combined to support the creation of more complex programs. Events allow portions of a program to run based on a specific action. For example, students could write a program to explain the water cycle and when a specific component is clicked (event), the program would show information about that part of the water cycle. Conditionals allow for the execution of a portion of code in a program when a certain condition is true. For example, students could write a math game that asks multiplication fact questions and then uses a conditional to check whether or not the answer that was entered is correct. Loops allow for the repetition of a sequence of code multiple times. For example, in a program that produces an animation about a famous historical character, students could use a loop to have the character walk across the screen as they introduce themselves.
- **MS-ETS1** Define the criteria and constraints of a design problem with sufficient precision to ensure a successful solution, taking into account relevant scientific principles and potential impacts on people and the natural environment that may limit possible solutions.
- **MS-ETS2** Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem.

## Materials supplied by classroom teacher:

- 1-2 Rolls-Masking Tape (to hold down periodic table and for students to mark a start/stop spot when programming)

## Materials supplied by Greenbush:

- Sphero and docking station for charging with charging blocks.
- iPad with Sphero App and iPad charging station.
- Periodic Tables and Element Flashcards

## Advanced Preparation for teacher:

- Make sure the Sphero's and iPads are charged.
- Each student should have an iPad and a Sphero and docking station at their desk.
- Please print a Sphero protractor (at the end of the packet) for each student or pair of students.

## Post Lab Sanitation:

- Please make sure iPads and Spheros' are sanitized (Lysol spray or wipes) and charged. A solid blue light means it is charged; a blinking blue light means it is charging. If there is no light, slowly rotate the Sphero until you see a light appear.



# Program Connection Information

***Please use an external microphone (conference style) rather than the integrated one in the computer for the audio for your class and locate it centrally in the room. It can be difficult for the Greenbush teacher to hear the students using the computer microphone and therefore it reduces the interactive nature of the lesson. It is fine to use the computer webcam for your video source though.***

All classes will take place using Zoom desktop video. If your building is already set up to use a desktop video application with a computer, simply open a browser and enter <https://greenbush.zoom.us/j/6913388482> in the URL space. You may need to download Zoom launcher software (free download) if you don't already have it. This needs to be done in advance of the lesson.

If using a Polycom video conferencing unit (or any legacy type video conferencing unit) to connect to a ZOOM conference, make sure the unit is in "encrypted mode" then dial the following IP on the internet: 162.255.37.11 or 162.255.36.11 and once connected, they will ask for a MEETING ID: enter 6913388482 (for Kenzie at Science Center).

It's always a good idea to touch base with your district technology facilitator prior to your program to make sure all systems/equipment are in place and operational and no firewalls that might prevent you from connecting to Zoom.

Once you connect, you will enter a Zoom waiting room. Your Greenbush teacher will admit you into the final meeting room.

Classes take place at the following times:

9:00-9:45

10:00-10:45

12:15-1:00

1:15-2:00

2:15-3:00

If you log in during one of those times, you may connect during another class' lesson. If you do, please check your connection to make sure things are working properly and then leave the meeting until your scheduled time by selecting "End Meeting" in the lower right corner of your Zoom screen and click on "End Meeting". You will need to rejoin the meeting at your scheduled time. This prevents your site from interfering with the lesson currently in progress. After your lesson is finished, please leave the meeting.

If you have questions, please call Kenzie Heatherly at Greenbush (620-724-6281).

# Sphero Protractor

Print on card

