

5th Grade-Mission Sphero

Essential Question: How does coding impact our lives?

Students will learn the importance of coding and how it is used in everyday life. During Mission Sphero, students will learn Sphero basics by “driving” the Sphero, changing its colors and speed, and participating in activities that demonstrate how coding is used in the real world. After mastering the basics, students will use the engineering design process to create a garage and code a mission to practice their Spheros’ parking skills.

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.

- **3-5-ETS1-1** Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost.
- **3-5-ETS1-2** Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.
- **3-5-ETS1-3** Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved.

Materials supplied by classroom teacher:

- Masking tape
- Teacher copy of Sphero Protractor (attached below)
- Materials to build a garage. You can choose whatever works best for your classroom and whatever you have access to!
 - Option 1: Popsicle sticks or pencils and tape
 - Option 2: Have each student bring in clean recyclables to class to build their garage for their sphero (Set a limit on how much they bring. A good guide is telling them they can bring 3-4 pieces of clean recyclables to build with. Don't tell them what they are building! Just tell them they will be using the materials to build something.)

Materials supplied by Greenbush:

- Sphero and docking station for charging with charging blocks.
- iPad with Sphero App and iPad charging station.

Advanced Preparation:

- Make sure the Sphero's and iPads are charged.
- Each student should have an iPad and a Sphero and docking station at their desk.

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).

Prior to the IDL lesson, please pre-teach and practice these cooperative learning techniques with your students. These will be used in the IDL lessons this school year.

Round Robin

Each member of the team takes a turn sharing orally with the team.

Rally Robin

With a partner, students take turns sharing brief oral responses.

Timed Pair Share

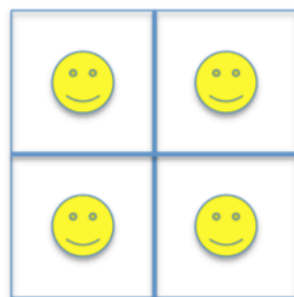
In pairs, students share with a partner for a predetermined time while the partner listens. Then partners switch roles.

Stand Up, Hand Up, Pair Up

Students move around with hands in the air and quickly find a partner with whom to share or discuss. Once students find a partner, they give each other a “high five” and stand together, ready for the next instructions.

More terms to know -

Shoulder Partner:
The person sitting on
the student's right or
left.



Face Partner:
The person
sitting facing the
student.

Sphero Protractor

Print on card

