Lesson 1-Sphero Robots (1.MP.1)

Objective is to explore the robots and try to solve the question: How do these robots operate, or what makes the robots work.

Students will work in small groups (groups of 2-3). Each group will get one box including one robot and colored (green, yellow, and red) command mats. Students will go over the rules of group work: every person needs a turn to look, feel, and discover. Students must talk with each other and agree on what they should try and what they want to do next. They must take turns trying different predictions.

Students will have 10 minutes to work on getting their robots to work, then we will meet together on the carpet with the whole class to talk about what was discovered.

Apply: What was the problem? Were you able to work together to solve the problem? What worked best? What didn’t work? What would you do differently next time? What did you discover about the robots?

Some things that students need to understand by the end of the lesson: the green mat starts the robots, green means go. The mats give the robots the command to do something new-or-the robots do not work without the mats. Another questions we could ask or try out is if we used colored paper or something else colorful, would it also give the robot a new command?

Reflection on working with a group: (help students understand that this is not a tattle tale session) How did you do working with others? Did you take fair turns? Was your group able to figure out a system where everyone had a voice and felt heard? Think about how you worked with your group, were you helpful to others or were you bossy, mean, or unfair? How can you be more helpful next time you work with a group?

Lesson 2-Sphero Robots (1.CS.1)

Today students will be working alone. Recall from the previous lesson what made the Indi robots work. How do we know, or what did we discover? What other tech works like Indy? Have you ever used technology? What is technology? What makes technology work?

Procedures: Pass out calculators to students (they will have to work in groups of two with the calculators). Have students type in a known addition equation, and a known subtraction equation. Have students type in an unknown addition and subtraction equation. Teach students that calculators are a type of technology that use a certain type of software to perform a specific function. They are excellent for solving math equations quickly, but not good for anything else because they are not programmed for anything else. Have students use their iPads to explore more types of technology. We will use the camera app to take a picture and edit it. We will use the pages app to type a sentence. With each program, we will talk about how the software tells the computer what to do, and that each “app” is software that has a purpose. Software makes the computer easy to run, makes it look nice. The software tells the computer hardware what to do, or which tasks it needs to perform. Hardware is the physical device (calculator, iPad, computer monitor, or printer, where software is the program like an operating system or an app that will tell the hardware what to do. Software is not something that I can hold onto. Put hardware and software definitions and examples on an anchor chart.

Apply: In their science notebooks, students will draw a table and put hardware on one side of the table and software on the other side. They will record three types of computer hardware that we explored today (calculator, iPad and computer monitor or printer), and they will record three types of computer software they are familiar with (could be a video game, an app, or something we explored today such as the camera or pages app).

Lesson 3-Sphero Robots

The idea behind this lesson is to help students understand that technology will always do what it is programmed to do, no matter what technology you are using, we will also talk about a sequence of steps being a key component of using technology and getting it to do what you want it to do. (1.AP.2) Students will compare and contrast the Sphero Indi Robot and other technology that they know and use. The teacher will demonstrate using a word processing app (Pages or Microsoft Word) how a sequence of steps is necessary to get the words to look just like I want them. Then demonstrate that a calculator cannot do a subtraction problem unless it is typed in a correct order (sequence of events). Then the teacher will demonstrate that the Sphere Indi Robot can also do what I want it to do, if I give it the right instructions. Students will then be grouped into groups of 2-3 students and will be given a puzzle for their Indi Robot to solve. (Easy or difficulty of puzzle will be used for differentiation at this step). Before students can get to work on the puzzle, they will record in their science what each color of command mat does. They will draw a picture of their puzzle in their science notebook and draw up a hypothesis about what pieces are missing and needed to complete their puzzle. (1.CT.1) Next, they will test their hypothesis and make adjustments as needed. (1.MP.6) Whole group reflection at the end will let other students hear how each group of students learned to best solve their puzzle, what worked best and what didn’t work.

Lesson 4-Sphero Robots

Problem to be solved: Race your Sphero Indi Robot. Students will compete with other groups to see who can get their Indi Robot across the classroom the fastest to knock down a specific group of stacked cups. (1.MP.8, 1.MP.6, 1.AP.2, 1.CT.2, 1.MD.2) Each group will be assigned a different color of cups to knock down. The cups will not be directly in front of their starting place. Students will have time to plan their robot route with their groups before they compete. They will be instructed to be respectful to all ideas and open to hearing each team member defend their plan. (1.MP.3) During this time the teacher will be moving around the room and asking students to solve additional problems such as how far will Indi go before it needs another command? (1.MD.2) Or what is the sequence of steps or commands that they are giving Indi? Students will be reminded that they need to be respectful to other groups-no booing, only positive cheers for other groups. When students are ready, we will begin the races. Then we will reflect as a class asking questions like: What was the hardest part? What was the easiest part? How did you fix mistakes when they happened? What would you have done differently?

Lesson 5-Sphero Robots

Problem to be solved: The software is the code that tells the Sphero Indi Robot what to do when it runs over a mat, or what color of lights to turn on when it is doing a certain action. If you were given the right tools, could you change the commands that Indi understands? Students will use the Sphero EduJr. App on their iPads and work in a group of 2-3 students. They will work together to change the code that Indi responds to. Then they will present their final project to the class.