Verizon Innovative Learning Lab Program

Artificial Intelligence & Robotics

Course Overview

verizon

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Course length

This course will take approximately 10 weeks (assuming five 50-minute class periods per week).

Course overview

Welcome to Artificial Intelligence + Robotics Course. This is an environmental ocean voyage themed course that follows a group of researchers and scientists aboard the research vessel, New Horizon on the SEAPLEX (Scripps Environmental Accumulation of Plastic Expedition) mission as chronicled in the book "Plastic, Ahoy!" by Patricia Newman. Middle school students will travel along with the scientists to the Great Pacific Garbage Patch learning along the way all about Artificial Intelligence and Robotics, how it can be applied to real world scenarios, like those aboard the New Horizon voyage, and empowering them to problem solve and become creators in robotics and artificial intelligence.

Students will learn the basics of AI, robotics hardware and software, as well as be introduced to AI ethics, machine learning and biases. Finally, students will solve coding and robotics challenges by building and programming their own robots and microcontrollers with a variety of expansion kits through sustainability-themed projects tied to our ocean themed voyage.

This course should be facilitated in a traditional style using the provided presentations and worksheets. Students can complete some modules in a self-guided capacity through a learning management system. The RVR programming components work best with hands-on, in person hardware access while certain MakeCode Micro:bit lessons can be accessed completely online. We recommend finding the best balance between synchronous and asynchronous learning for your classroom.

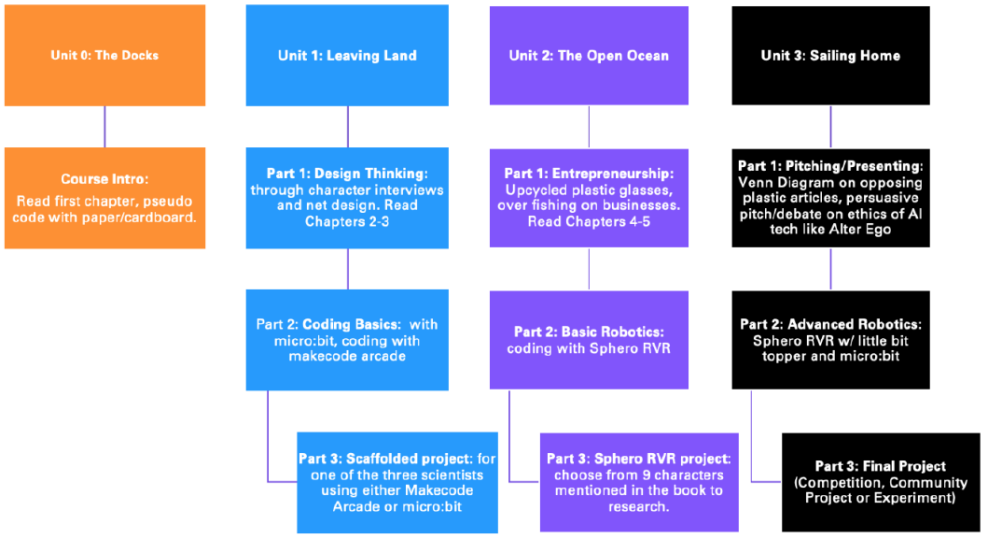
Main course objectives

Students will be able to:

- Define sustainability and solve various sustainability challenges.
- Utilize the Design Thinking process to solve real world problems.
- Develop an entrepreneurial mindset to recognize opportunities and materialize ideas.
- Explore real world concepts with robotics and AI such as machine learning, ethics, and computing bias.
- Use block code to program a robot and a microcontroller.
- Enhance robotic capabilities with sensors and actuators in expansion kits.
- Solve real-life sustainability challenges with robotics, microcontrollers, and programming.

Before you begin

- Review the technology whitelist at the end of this document send it to your IT department.
- Ensure you have access to all lessons and course content.
- Familiarize yourself with the course structure:



Best practices

- This is YOUR course: customize it and facilitate it to best meet your own students' needs.
- Classroom space and map planning: this course utilizes Sphero RVR robots that students program and run. In each lesson that requires a program, suggested maps and cleared area space is included in the lesson. Feel free to use these maps and guidelines or create maps and area that works for your setting. The RVR can be taken outdoors to run programs but it should not be taken near water or ever immersed in water.
- Set norms and routines for the course: will students enter class and begin completing a lesson independently? Will students work in pairs? Perhaps you will "present" each lesson at the front of the room.
- Keep students accountable and evenly paced. Perhaps students cannot move on to the next lesson until their activity has been graded.
- View facilitator guides, presentations, and activities 1-2 days before teaching them! You are not expected to be an expert at the content and technology in this course, but you are expected to learn alongside your students and help them troubleshoot!
- Develop organized systems for technology: how will students label and store hardware like Sphero RVR, littleBits and Micro:bit kits? How will students submit their digital experiences?
- Train a "technology team": a group of 2-3 responsible students you can task with managing RVR, littleBits, Micro:bits and other technology.
- This course can be taught partially remotely: Micro:bit lessons use MakeCode which is entirely online. The RVR robotics programming challenge portions are in person only lessons requiring the hardware in person to test and run.

We are so happy to have you and your students participate in this course and learn about emerging technology. Take this curriculum and technology and run with it! We can't wait to see what you and your students will create!

Recommended hardware

- To successfully teach all lessons in this course, we recommend purchasing a classroom set (15-30 of each) of the following technologies:
    - BBC Micro:bit
    - Sphero RVR

    - Sphero RVR + littleBits Topper Kit
- Your students will also need access to the internet and apps through either a laptop, tablet, or smartphone.

Technology whitelist

- Ensure your school's IT department has enabled students the ability to access the following websites and applications. These websites are student friendly, but district approval may vary.
- **Google Teachable Machine:** https://teachablemachine.withgoogle.com/
- **Scratch:** https://scratch.mit.edu/
- **MakeCode and MakeCode Arcade**
    - https://makecode.microbit.org/
    - https://arcade.makecode.com/--skillmap
- **Sphero Edu:** https://edu.sphero.com/gettingstarted
- Apple mobile app: https://apps.apple.com/us/app/sphero-sprk/id1017847674
- MacOS app: https://apps.apple.com/us/app/sphero-edu/id1349872101?mt=12
- Google Play app: https://play.google.com/store/apps/details?id=com.sphero.sprk&hl=en
- Microsoft Windows app: https://www.microsoft.com/en-us/p/sphero-edu/9n2796r62xlz?rtc=1&activetab=pivot:overviewtab
- Amazon app: https://www.amazon.com/gp/product/B018WUVNUK