

Coral Reef Cleanup - Educator Facilitation Guide

Overview of the Activity

In the Coral Reef Cleanup activity, students will code the VR Ocean Cleaning Robot in an immersive underwater Playground to collect and remove as much trash as possible from the floor of the Mangrove Reef. Since the VR Robot is equipped with batteries that will only last for a few minutes, students will be challenged to collect as much trash as they can, before the batteries on the VR Robot are drained. During the robot's operation, it will keep track of the weight of the trash it collects, and display that on the screen, so students can see their progress in real time. As the VR Robot collects trash, more trash will randomly fall into the Coral Reef. The Coral Reef Cleanup activity will end after the VR Robot's battery is empty or the robot is manually stopped. After the VR Robot's battery is empty or the robot is stopped, the total weight of trash collected will be displayed. Encourage students to try again to improve their project and collect more trash!

Department of Reef & Ocean Watchers

— Mission Briefing —

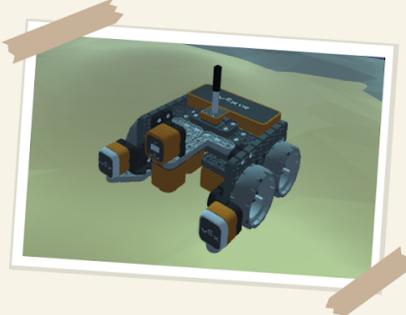
Operation: Clean Mangrove Reef

The VR Ocean Cleaning Robot is equipped with a solar charger and batteries. However, due to the amount of power required to operate the Robot's underwater drivetrain, the VR Robot may only run for a few minutes until the batteries are drained.

Special Equipment:

..... 1x VR Ocean
..... Cleaning Robot

After the VR Robot's battery is empty or the activity is stopped, you will see the total weight of trash collected.





D. Row
Government Division Commander

More about the VR Robot's Batteries:

- Battery will drain based on the speed of the robot.
- Control the speed of the VR Robot using the Drivetrain velocity commands.
 - [Set drive velocity]
 - [Set turn velocity]
- The faster the speed, the faster the battery will drain.

Use Sensors in your Coding Strategy:

- Use the VR Robot's Distance Sensor to detect trash that has fallen to the ocean floor.
- Use the VR Robot's Down Eye Sensor to avoid running into the coral. Look for blue to detect the edge of the reef.

Before the Activity

Before getting started with the Coral Reef Cleanup activity, ensure that you have all the materials and information you need to facilitate the activity with your students.

Ensure you have the necessary materials

- Each student will receive a certificate at the end of the activity. Ensure you have access to paper and a printer to print the certificates for your students.
- Each level contains an embedded tutorial video at the start of this activity. If you want your students to watch this video individually, ensure each student has access to headphones.
- If you are introducing cross-curricular concepts with this activity, you should also gather those materials before starting. See the [Cross-Curricular Activities & Extensions resource](#) for examples of how to frame the Coral Reef Cleanup activity in your subject area.

Prepare your classroom setup

- Decide in advance if you would like your students to work independently or in pairs.
- Plan approximately 30-60 minutes for the activity.
- Test the activity yourself before assigning it to your students. Check your technology in advance to see if anything needs troubleshooting before you begin.

Help your students select a level

There are different activity levels available for students. Decide in advance if you want the students in your class to all begin on the same level, or if students will select a level individually.

- **Level 1:** intended for students with little to no coding experience. This level introduces students to coding the robot to drive forward, in reverse, and turn.
- **Level 2:** intended for students who have had some coding experience and are somewhat familiar with coding concepts such as loops, conditionals, and how to code with robotic sensor feedback.
- **Level 3:** intended for students who are experienced coders and are familiar with coding concepts such as how to develop an algorithm.

Each level begins with a tutorial video about the Coral Reef Cleanup activity. Have students watch the tutorial video to learn about how to use VEXcode VR, and level-specific coding concepts and projects.

VEXcode VR supports Python coding

Are your students programming in Python instead of blocks? No problem! VEXcode VR supports both block and Python programming, so your students can still participate in the activity! For more information on using Python in VEXcode VR, view [these articles](#).

Introduce the activity

Get your students excited about coding a VR Ocean Cleaning Robot to help clean the Mangrove Reef! Introduce the activity as an opportunity for the students to code a robot to collect trash and help save the environment. Explain to students that coding, Computer Science, and robotics are used everywhere to solve problems. Begin by having the students watch the video on the student page either as a whole class or individually.

During the Activity

As you are facilitating the activity with your students, be prepared by having information on supporting strategies and troubleshooting techniques to help your students be successful.

Discussion Prompts

As students are coding, engage them in discussions that give them opportunities to share their thinking. Try using the following discussion prompts:

- What changes did you make to the example project?
- What did you notice about changing the order of the blocks in your project? How did that affect the VR Robot's movements?
- How can you improve your project to collect more trash?
- What is your strategy for collecting the most trash?

Troubleshooting with your students

VEXcode VR has support built-in so students have help at their fingertips. Guide students in using these resources as they create their projects.

- Investigate solutions together with your students. Reassure them that every time they try their project, they learn a little more.
- Use tutorial videos to help students find answers to questions as they work on their projects. Tutorials are short videos that illustrate how to complete certain behaviors or illustrate key concepts in coding.
- Use example projects. These are worked examples based on best practices so that students are using high-quality examples when they create their own projects.
- Use the Help feature for information on each block and to see examples of how it can be used in a project. See the [Access Help](#) article in the Knowledge Base to learn more.
- Search the VEX Knowledge Base for articles on [VEXcode VR](#) and for more information on [Teaching with VEXcode VR](#).

Keep your students engaged for the whole hour

- Are your students constantly driving into the reef? Introduce them to the Down Eye Sensor on the VR Robot to detect the blue border protecting the coral.
- Do your students want to make better use of their battery life? Have them move slower at the beginning of the project, then increase the speed once more trash has fallen.
- Are your students ready to use sensors to detect trash? Introduce them to the Distance Sensor on the VR Robot and the <Distance found object> block. This can be used to determine when a piece of trash is in front of your VR Robot!

After the Activity

Wrapping Up the Activity

After your students have completed the Coral Reef Cleanup activity, wrap up the experience with a brief discussion. For a coding-focused discussion, ask your students about their project and their final amount of collected trash.

- How much trash did you collect during the activity?
- How did you change your code throughout the activity?
- If you had to try one more time, how would you change your project?
- What was your strategy for collecting trash?

To introduce or close the activity with a connection to your subject area, see the [Cross-Curricular Activities & Extensions resource](#) for examples of how to frame the Coral Reef Cleanup activity in your subject area.

Celebrate Success!

After the activity has ended, celebrate with your students! Take a screenshot of each student's best result as well as the code used and submit it to the Google Drive folder which will be shared with you via email.



Cut off for submissions is Friday 29th January at 2pm Results will be shared on at 4pm!!!