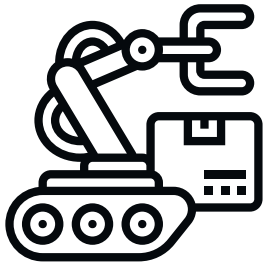


# Oceanic Obstacle Odyssey



What types of sensors and systems are commonly used in maritime mobile robots for navigation, obstacle avoidance, and data collection?

## Suggested Equipment Skill Level

Novice User

## Equipment Skills

Block Coding

## ROV Pilot Technician

### Career & Skillset Connections

- Interpersonal Skills
- Mechanical aptitude
- Maintenance of technical documentation

### Project Guiding Themes

- Engineering design process
- Designing obstacle path
- Coding the RVR+ to meet constraints

### Suggested Software & Materials

- Sphero App
- Various materials to create obstacle course

## Aligned VDOE CTE Course(s) and Competencies

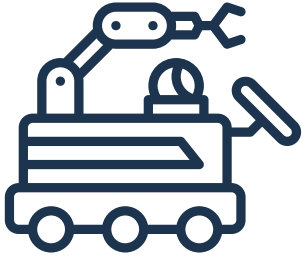
### Electronics/Industrial Robotics

36-Weeks

### Technology of Robotic Design

36-Weeks

# Oceanic Obstacle Odyssey



Mobile Robot-Novice Skill Level

What types of sensors and systems are commonly used in maritime mobile robots for navigation, obstacle avoidance, and data collection?

## Project Problem & Career Prompt

You are a skilled ROV (Remotely Operated Vehicle) pilot, entrusted with a crucial mission to survey the ocean floor for the installation of a new section of offshore wind turbines. Your task is to maneuver the ROV through a challenging underwater environment, filled with obstacles and potential hazards. The success of this mission is vital for the renewable energy project's progress and the protection of marine ecosystems. As you control the ROV, you encounter a labyrinth of towering rock formations, dense kelp forests, and colorful coral reefs. Maneuvering carefully around these obstacles, your task is to find the ideal locations for the wind turbines to maximize energy production while minimizing any potential impacts on marine life. In addition to piloting the ROV through the intricate underwater terrain, you have been assigned an important responsibility: generating a comprehensive report on your findings. Your report should include an overview of the surveyed area, an assessment of the underwater terrain and its suitability for wind turbine installation, and an evaluation of potential ecological impacts.

## Project Criteria

- Final program must be completed prior to the project deadline
- 4 different underwater obstacles are used in the course

## Project Constraints

- Program to operate RVR+ must be coded by you
- Underwater obstacle course cannot exceed 3'x3'
- Underwater obstacle course must be designed by you with representations of rock formations, kelp forests, and coral reefs.

## Suggested Pacing

- 1-2 Days of Research and Ideation
- 1-2 Days of underwater obstacle course construction
- 2-3 Days of Coding and Testing

## Project Background & Resources

Students should have a basic understanding of block coding used to program the Sphero RVR+. Research on underwater environments

[ROV Pilot Career Profile](#)

[https://www.youtube.com/watch?v=\\_IKEfGwILrY](https://www.youtube.com/watch?v=_IKEfGwILrY)

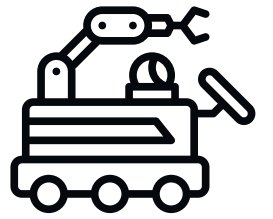
## Investigative Questions

- Are there any regulatory requirements or environmental guidelines that need to be followed?
- Does rock formations, kelp forests, or coral reefs affect the flow of water in areas? What does this mean for piloting a ROV?

# Oceanic Obstacle Odyssey



## Mobile Robots



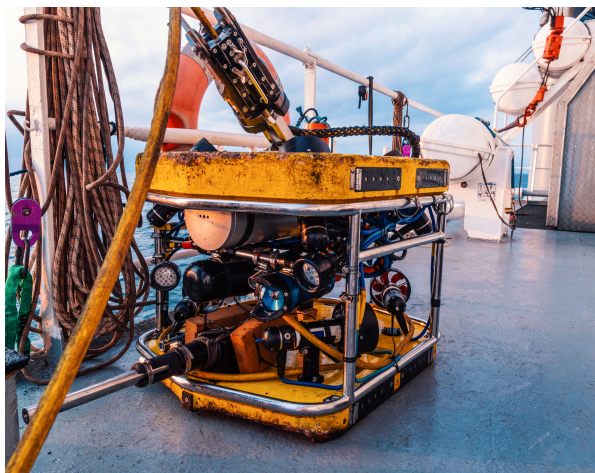
### Career & Skill Set Connections

## ROV Pilot Technician

A ROV Pilot Technician operates, maintains, and assembles ROV's (remotely operated underwater vehicles). The pilot technician would also analyze the data and videos collected to ensure the task has been completed.

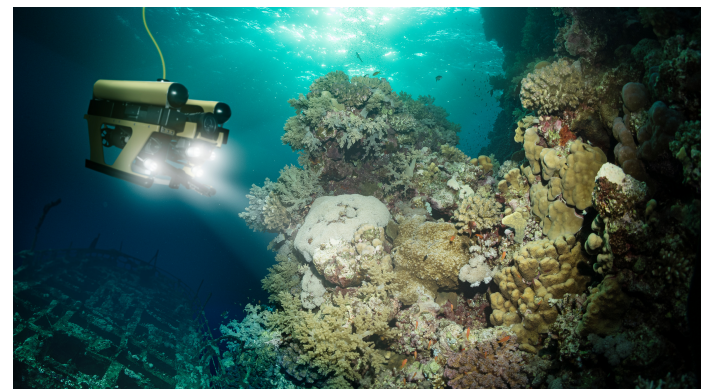
### Essential Skills

- \*Attention to detail
- \*Mechanically-inclined
- \*Written Communication
- \*Flexibility



### Academic Pathway

High School Diploma  
and  
Community College/Certification  
or  
Bachelor's Degree



### Aligned VDOE CTE Course(s) and Competencies

Workplace Readiness Skills & Work-Based Learning Opportunities & Examine All Aspects of an Industry

#### Electronics/Industrial Robotics

Understanding Physics

Perform measurements

Apply principles of the mechanics of robots

Explaining Robotics Applications

Explain the use of robotics for industrial applications

Introducing Robotics

Identify types of robot geometry, manipulators, and end effectors

Identify types of robot control and drive systems

#### Technology of Robotic Design

Exploring Robotics and automation Systems

Define robotics, automation, and control systems

Investigate careers in robotics, automation, and control systems

Explain the universal systems model (i.e., input, process, output, and feedback)

Exploring Microprocessor/Microcontroller (Computer) System Basics

Describe the function of an operating system

Describe how computers are used to control automated systems

Develop a computer-controlled model solution to a problem

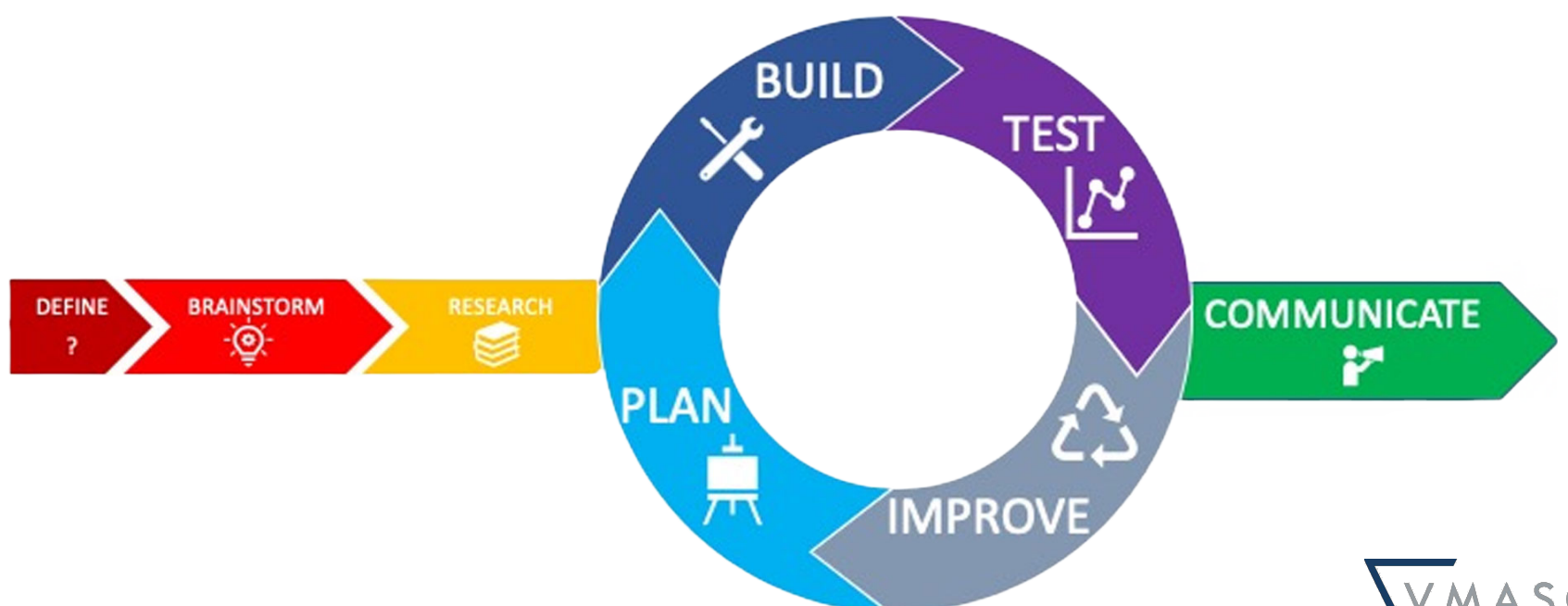
# Project Management Plan

Team  
Member  
Roles

Team  
Goals &  
Timelines

Team  
Member  
Tasking

# Sketches & Design Planning



# Notes

# Notes