

# ROVs: Drivers Wanted

## ACTIVITY SUMMARY

In this student challenge, teams of four or more students are tasked with constructing a device that can complete challenges analogous to real tasks performed by remotely operated vehicle (ROV) drivers in the field. Students are encouraged to be creative during this challenge as there are no right answers or defined solutions. Similar to the job of career scientists and engineers, innovation is key!

## TARGET CURRICULAR CONNECTION (British Columbia)

Applied Design, Skills and Technology, Big Idea:

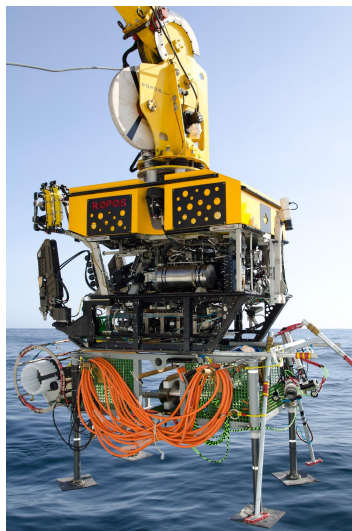
- Grades 4&5: The choice of technology and tool depends on the task.
- Grades 6-8: Complex tasks may require multiple tools and technologies

## ENVIRONMENT

Ocean Networks Canada operates cabled observatories in the Northeast Pacific Ocean, the Salish Sea, and coastal communities in British Columbia and Nunavut.

## ELDER

Indigenous people have been exploring the oceans from time immemorial. Please consult the Science First Peoples Grades 5-9 Teachers Resource for lesson ideas: [www.fnesc.ca/science-first-peoples/](http://www.fnesc.ca/science-first-peoples/)



The ROPOS ROV being deployed  
Photo Credit: Ocean Networks Canada

## ENGAGE

1. Watch the introductory video about Wally, the ROV used by ONC to collect scientific data: [bit.ly/ONCWally](http://bit.ly/ONCWally)
2. Discuss why ROVs might be used for scientific research in the deep sea (*example responses include depth, temperature, pressure*)

## MATERIALS

Suggested supply kits for students (1 set of these supplies/kit):

- One piece of recycling of their choosing
- An arm's length of masking tape for construction
- 8 popsicle sticks
- 2 chopsticks/bamboo skewers (to hang the ROV)
- 1 piece of white paper
- 30cm of yarn
- 6 paperclips
- Scissors
- Pen/pencil

Suggested supplies for ROV tasks:

- A few cups of flour
- Cookie sheets
- Large bag of marshmallows or gummy bears
- A few blindfolds

Activity supplies:

- [ROV challenge cards](#)

## CONNECT

For additional lessons and resources, visit <https://www.oceannetworks.ca/learning>

Questions? Contact our Learning and Community Engagement team at [learning@oceannetworks.ca](mailto:learning@oceannetworks.ca)

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## EXPLORE

The students have 30 minutes to build a device they feel will be able to complete various challenges that simulate the operations of an ROV listed below. Additional instructions for students are detailed on the [ROV challenge cards](#)

- Navigating dangerous terrain
- Collecting a sample from a sediment covered seafloor
- Carefully depositing a payload

Suggested requirements for the challenge:

- The ROV must hang level from a tether to mimic how an ROV is deployed from a vessel at sea. Students must suspend their ROV from a string attached to a chopstick
- The ROV must have a drag cable of 30cm which mimics the tether that provides power to and protects from the ROV being lost at sea
- The ROV must be able to independently pick up and drop off a payload. In other words, students cannot touch the ROV directly, but they can touch it indirectly (for example, they may use strings or other parts of the building kit)

## EXPLAIN

After this activity, students should be able to define the following:

**Payload:** An object, such as a scientific instrument or experiment, that is being specifically placed by a ROV in a particular location, like one of the ONC nodes on the ocean floor.

**ROV:** A Remotely Operated Vehicle (ROV) is a machine that is used in ocean exploration and/or ocean technology maintenance, and it is controlled remotely by ROV pilots. ROVs can explore and work in environments where humans can not physically go themselves.

**Sediment:** Depending on location, the ocean floor can be covered in sediment, a loose material that can include organic debris (once living) or non-living material such as sand, mud, and rocks.

**Tether:** A direct connection between a ROV and the vessel that is deploying it. An umbilical tether allows the ROV pilot/technicians to control the ROVs movements.

## ELABORATE

- Incorporate a design thinking framework where students draft prototypes and use feedback to alter their models
- Include a budget component where materials are listed by cost and students shop for the ROV materials

## EVALUATE

- Ask the students to create a job description for what it takes to be a ROV pilot/technician
- Ask the students to reflect on their own experience of designing, building and/or working in a team