

Mission: Protect our oceans



Workshop Guide

The aim of Little Inventors workshops is to allow students to express the far reaches of their imagination. To inspire students to think up and draw original, ingenious, funny, fantastical or perfectly practical invention ideas. There are no limits!

Mission: Protect our oceans offers a creative approach to learning about the oceans and issues that affect us all: the environment, the impacts of climate change, and our future. Developed with the Natural Sciences and Engineering Research Council of Canada (NSERC) in partnership with the Canadian Commission for the United Nations Educational, Scientific and Cultural Organization (CCUNESCO). The Mission: Protect our oceans presentation, offers a fresh way to learn about why the oceans matter, about sea life and habitats and the threats and challenges to ocean health.

Students will be able to draw and submit their own inventions to appear on nserc.littleinventors.org, where they will be reviewed by the Little Inventors team, NSERC and CCUNESCO! Their idea might be chosen as team favourite, turned into an animation or even made into a real object by one of our Magnificent Makers. The winners will be invited to take part in a special exhibition in 2021 to celebrate the launch of the **United Nations Decade of Ocean Science for Sustainable Development**.

Mission: Protect our oceans also offers further extension resource packs exploring two themes:

- **A world of pollution:** a collection of three PowerPoint presentations, associated activity sheets and guide that you can choose from to dive deeper into important ocean themes: Ocean pollution, The plastic problem, Ocean = carbon eater
- **Climate Power:** another three presentations with their own activity sheet and guide that you can choose to support the challenge in more depth on the following themes: the water cycle, the role of oceans in the weather, climate change issues) – Available by June 8, 2020, World Oceans Day

The resources have been designed to support scaffolded learning for students age 5 to 15 years old to stretch their imagination and creativity. Each resource includes a PowerPoint presentation, an activity sheets and resource guide.

Use the notes in the presentation to deliver your workshop. You can choose the slides that you think are most appropriate to support your lesson, whether for elementary or secondary students. The notes are coded in regular font for content that is more accessible and **in bold for content that is more advanced**.



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Familiarize yourself with the resources available before the workshop

Start by downloading the challenge pack.

Mission: protect our oceans presentation

Use this presentation on a whiteboard or computer to help you deliver the workshop.

Printed materials

Per student:

1x Invention sheet (worth printing a few spare ones!)

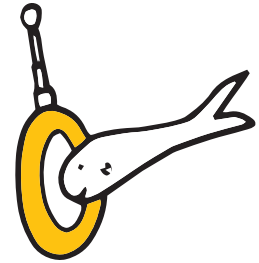
1x Ocean profiler activity sheet OR

1x Ocean state of mind activity sheet OR

1x Ocean deep dive activity sheet

Tools or materials needed during the workshop

Make sure you have plenty of black pens and colouring pens available for the workshop!



Running the workshop

This guide suggests how you might want to use the Little Inventors resources to run a structured workshop over a single or double lesson. Customizable and extended activities are also provided to enable all students to make the most of the workshop.

The workshop is composed of 6 activities:

1. Starter activity - Mission: Protect our oceans presentation
2. Ocean profiler
3. Ocean state of mind
4. Ocean deep dive
5. What's your invention?
6. Rounding up

The total time required to complete the following activities varies but we recommend running it over one to three sessions. Some of the activities could also be set as homework. You may want to deliver this as part of an existing scheme on the ocean or the environment, or as a stand-alone project. It's up to you!

Starter activity: Mission: Protect our oceans presentation (15-20 mins)

Explain that in this workshop, students will get to learn why the oceans matter, about sea life, habitats and the threats and challenges to ocean health. They will then get a chance to come up with an invention idea to help protect the oceans and will get a chance to enter their invention idea in the Mission: Protect our oceans challenge.

Have a class discussion on why inventing is important, for example:



- What is an invention?
- Can you name some well known inventions?
- What about ordinary objects? Why were they invented?
- Inventions are used to solve problems - can you think about problems or things that could be made more interesting or fun, now and in the future?
- Can you think of things which are difficult to do now and how they might be easier to do in the future?

Open the **Mission: Protect our oceans** presentation and go through the slides with your class:

- Slides 2 and 3 explain who NSERC, CCUNESCO and Little Inventors are and what taking part in the challenge can look like - play the video to show them the previous challenge, Inventions for space with the Canadian Space Agency.
- Slides 4-5 and 6-7 introduce the world's oceans and Canada's unique position surrounded by three oceans and the relationship of rivers and the oceans.
- Slides 8-9 introduce the essential role of oceans on our planet and give examples to illustrate how vast and impressive it is as part of our ecosystem.
- Slide 10 looks at the different zones in the ocean, their characteristics and what creatures inhabit them. • Slide 11 picks examples from the ocean to show how evolution is a great example of nature inventing solutions.
- Slide 12 supports the Ocean profiler activity by showing an example of researching a creature (the bristlemouth).
- Slide 13 introduces the dependency of humans on the ocean, as a resource, as a crucial part of the water cycle, for energy, transportation, but also for fun!
- Slides 14-15 encourage discussion about the threats to our oceans, such as climate change, pollution, plastics, rising sea levels and overfishing, and their impact such as extreme weather, flooding, diminishing water supply, land, food and materials.
- Slide 16 introduces the UN Decade of Ocean Science goals (a clean water, a safe ocean, a healthy ocean, a sustainable ocean, a predictable ocean, a transparent ocean - for more information and for advanced students, you can check https://www.oceandecade.org/assets/The_Science_We_Need_For_The_Ocean_We_Want.pdf).
- Slide 17 supports the Ocean state of mind activity sheet, a mind map exercise to develop your students' thinking about the ocean.
- Slide 18 supports the Ocean deep dive activity sheet, to encourage students to do more in depth research about a specific ocean topic.
- Slides 19-20 give students prompts and tips to start thinking of invention ideas
- Slide 21 offers further useful links for more information and research.

You can make this PowerPoint as interactive as you wish by asking your students questions throughout, such as:

- What oceans surround Canada? What are the main rivers in Canada?
- Think of examples of very tall buildings or monuments they are aware of in Canada or beyond and asking them to research their size and height
- What are the different zones in the ocean?
- Think of examples of different sea creatures, what characterizes their habitat? What are their special features? What is their life like?
- Why are we dependent on the oceans and what activities are connected to the oceans?
- Are the oceans only relevant to people who live on the coast?
- What are the threats to the ocean?
- What are the consequences of human activity?
- Why do we need to look after our oceans?
- What could the future of the oceans look like?
- What would a happy ocean be like?



Activity 2: Ocean profiler (10-15 mins)

Inventions happen when someone needs help with something! Tell your students that this **Ocean profiler** will help them form a picture in their mind of a sea creature or someone who has a link to the ocean. By thinking about everyday details, students can start figuring out ideas on how they could invent to help their chosen subject. This exercise can be done as a discussion in pairs, with a bit of research, or letting their imagination loose!

- Give students an **Ocean profiler** activity sheet.
- Get them started by drawing their subject.
- Ask them to write down information about the creature or person by thinking about.
- Where and how they live, what is special about them or the dangers they face.
- Ask them to think about how they can help. It could be a practical idea to solve a problem, to make life easier, it could also just be fun and fantastical!

Customization: Instead of writing their description, students could draw their character and add keywords to explain who they are, where they live, their likes and dislikes.

Extended activity: You could ask your students to write a story, or draw a comic strip about this character, their life and how the invention could change their life.

This activity sheet can also be used to support the extension resources.

Activity 3 Ocean state of mind - Mind Map (10-15 mins)

This Ocean State of Mind is a mind mapping activity. It encourages students to think in more depth about the different environments, elements and challenges that are relevant to the oceans in order to develop a better idea for an invention before drawing it.

- Give students an Ocean State of Mind activity sheet.
- Ask them to write down words that come to their minds when thinking about sea creatures, humans' relationship to the ocean, but also key challenges such as pollution and climate. They can also add their own thoughts and words as they see fit!
- You might want to get students to work in pairs or small groups to share their ideas.
- You can help them by asking them to think about different questions: what it is, where does it take place, when, who is involved, what happens, etc...
- Ask students to repeat the process with the words they have written down to create another layer of words.
- Ask them to explore words they have written down — what idea does it give them for an invention?

Customization: Get students to draw their own version of the ocean. What creatures are there, what features, including human activity.

Extended activity: Ask students to do a secondary mind map focusing on one specific aspect and expanding it in more depth.

This activity sheet can also be used to support the extension resources.



Activity 4 : Ocean Deep Dive (15-20 mins)

This activity encourages students to think about and research different aspects of their chosen topic or challenge about the ocean in more depth and develop their thinking to think up an original invention idea.

Give young people an Ocean Deep Dive activity sheet.

Get them to think of a topic, a feature or challenge to do with the oceans.



Ask them to fill in all the sections on the sheet, by reflecting or even researching further by asking a partner or browsing on the internet where needed:

- What are the threats and problems
- What information they have found out
- What could be done differently
- What could the future look like
- Ask them to use all the information above to think up a way that can help

Differentiation: Use the mind-map activity as an alternative to organise their thoughts.

Extension activity: They could create a presentation or video to explain the context and thinking about their chosen topic.

This activity sheet can also be used to support the extension resources.



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Activity 5: What's your invention? (20-40 mins)

Once students have had a chance to develop their ideas a little through one or more of the activity sheets, give them an invention sheet to draw and explain their own invention.

Students can draw more than one invention if they want.

Differentiation: Students make a video or audio recording to explain how they got their idea in their own words.

Extension activities: Students come up with their own invention ideas, draw them and explain how they think it can work and how it can be made. Students could also make a model of their invention. Students can create a poster for their invention or making a video about it.

Activity 6: Round-up! (5-15 mins)

Gather all the student invention drawings in a gallery around the classroom / workspace. Get students to discuss their favourite ideas — what do they like and why? Encourage positive feedback throughout.

- What do they think of their invention?
- What are its strengths and weaknesses?
- How do they think their invention would work in real life?
- Can they imagine their invention being used by other people? What would they say?
- What other ideas or challenges can they think of?
- Why are inventions useful?
- How will they approach problems in the future?



Give students extra *invention sheets* to come up with more invention ideas at home. They can also download more invention sheets for free on nserc.littleinventors.org

After the workshop: Make sure you collect all invention sheets during the workshop. Invention drawings should be scanned (rather than photographed) to be uploaded on nserc.littleinventors.org for a chance to get picked as Little Inventors team favourites, turned into animations or even get made into real objects!

With thanks to Let's Talk Science for contributing their expertise in bringing these resources together.

You can find useful learning strategies and further ocean related resources <https://letstalkscience.ca/educational-resources/learning-strategies>

<https://letstalkscience.ca/resources/search> (type "ocean" in the search box)