



Environment and
Climate Change Canada

Environnement et
Changement climatique Canada



Ocean
School

ocean wise.



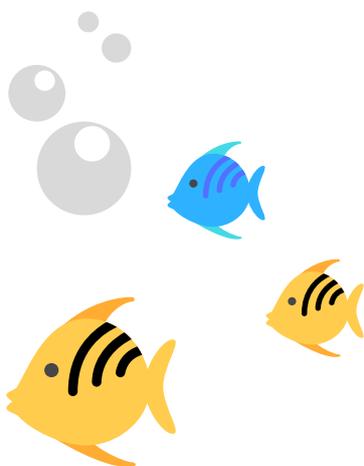
Sea Smart



STUDENTS ON ICE
FOUNDATION - FONDATION



PLASTIC EDUCATION KIT



A RESOURCE GUIDE FOR

**TEACHERS LEADING
CHANGE**

GRADES 2-3

www.plasticsedkit.ocean.org

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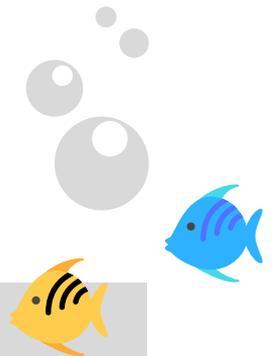
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Help us inspire our youth to break the plastic pattern...

and protect our ocean.



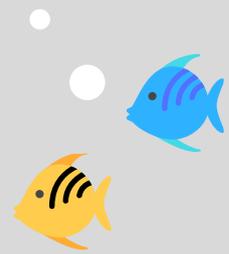
At least **8 million tonnes**
of *plastics leak* into the ocean each year.



But why does the ocean matter?



- No oceans, no us!
- Life on Earth cannot exist without our oceans
- Our oceans produce over 50% of the oxygen we breathe
- Our oceans control weather and temperature
- 40% of carbon dioxide gets absorbed by our oceans
- 4.3 billion people rely on seafood for protein



Why is plastic pollution a problem?



- More than 500 billion kg of plastic is produced every year
- Forty percent of all plastic produced is designed for single use
- Plastic never disappears, instead it breaks up into smaller pieces, absorbing and releasing poisons along the way
- Over 90 % of marine birds have plastic pieces in their stomachs
- Plastic is killing more than 100,000 sea turtles, birds, whales, dolphins, and other animals each year from ingestion and entanglement.
- Plastic and other forms of pollution are ending up in our marine life, and it's making its way into our food chain. Fish eat plastic - we eat fish.
- Other toxins from plastic disposal are ending up in our bodies.
- Plastic is in our tap and bottled water, seafood and in the air we breathe

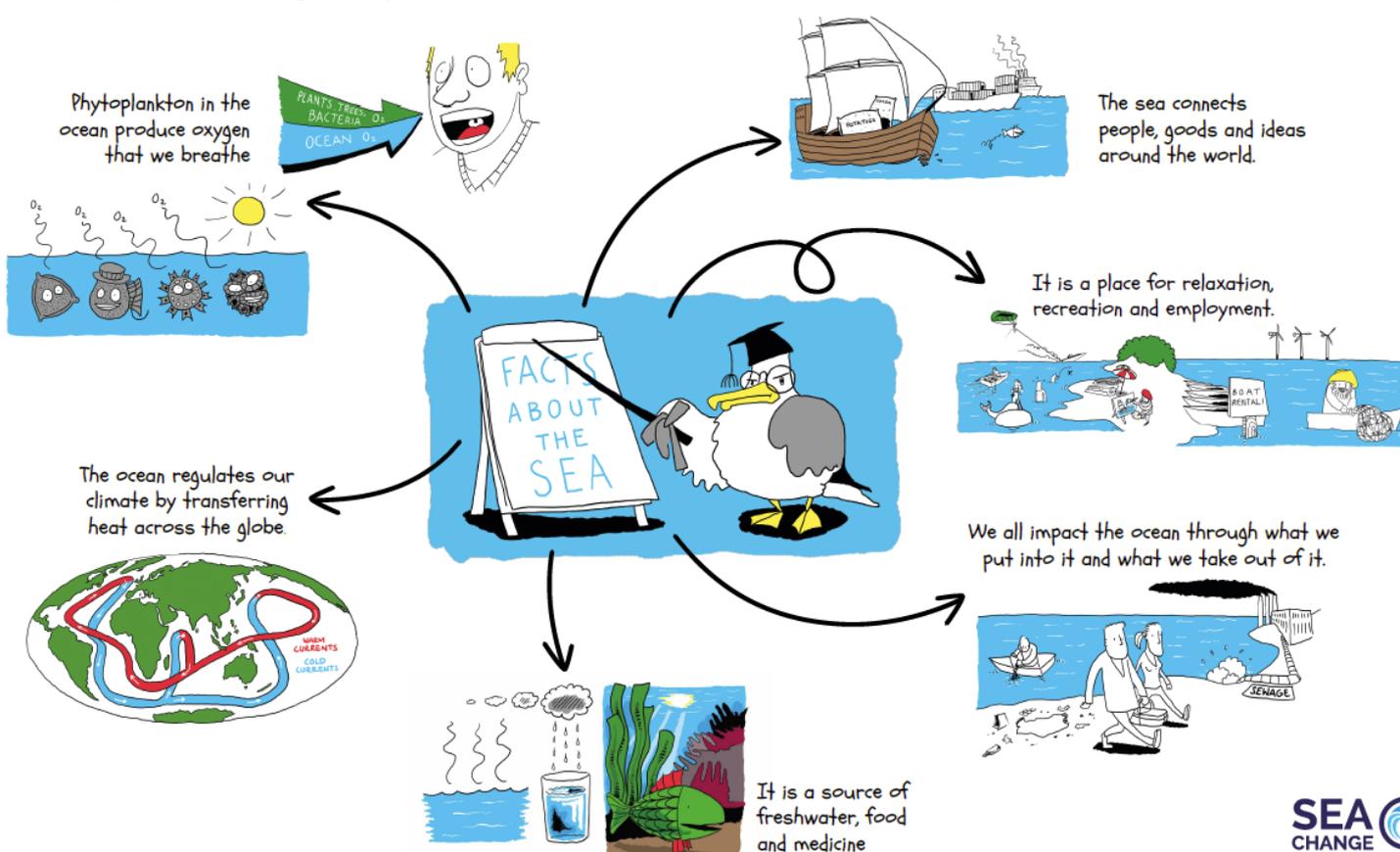
Dear Teachers...

The Earth's oceans, and the interconnected cycle of water and waterways, are utterly vital to every living thing on Earth. And yet the health of these oceans, and by extension the wellbeing of all life on Earth, is at risk due largely to the impacts of human activity. Plastic is everywhere in our oceans and it's going to take a deep, transformational change in humanity's consciousness and activities regarding the oceans to ensure healthy, sustainable life on this planet. We believe this is possible! **But we need your help.** Our youth need to be made aware of their own plastic use and how their actions will have a direct impact on the environment around them. Through these lessons we hope our youth will become leaders of change - and this all starts in your classroom. Thank you for caring and helping us break this pattern!

Why Canada?

- Canada has 243,000 km of coastline - the longest coastline in the WORLD!
- Of the five ocean basins, Canada's coast touches three of these; the Atlantic, Arctic and Pacific Oceans
- We also have more surface area covered by lakes than any other country in the world.
- Canada has North America's strongest current - located in the Discovery Passage in BC, with speeds up to 17km/hr.
- With millions of lakes, Canada has more lake area than any other in the world!

UNDERSTANDING OUR OCEAN



“My Ocean Promise is to respect the ocean and appreciate what it gives me.”



LESSON
1
GRADES
2-3

Students will be able to:

- ✓ Explain ways the ocean helps us.
- ✓ Understand how we are harming the oceans.
- ✓ Explain what makes up a healthy ocean some aspects of the environment within it.

The action of the ocean changes the shape of the land. It does this by the slow, continuous movement of seawater, erosion of land deposition of the ocean sediments across geological eras working together to create the landscape. Not only has the ocean changed our landscape, we also rely on it for our every day life. It gives us food, energy, medicine, transportation, recreation, travel, tourism and even our climate! In this lesson students will reflect on the importance of our oceans, ways we harm the ocean and what we can do to help it. This lesson should be interactive, where students can communicate their thoughts their thoughts with the class..

The ocean and life in the ocean shapes the earth.



Plastic is changing the ocean environment.

Materials

- Student Workbook
- Pencil



CRITICAL QUESTIONS

How does the ocean help us? How can we help the ocean? What happens when plastic is added to an ocean environment?



LESSON GUIDE

- 1) **Workbook Page 1:** Give the students 5 minutes to brainstorm each bubble and then come back as a class and share their ideas. Ensure they add the ideas of others to their own map. Ex. We can help by waste-reduced shopping, beach clean-ups, local ban on straws, reduce snack and lunch box packaging, buy fewer plastic toys and plastic stickers, stop washing acrylic paint down the drain.
- 2) **Workbook Page 2:** Discuss aspects found in the ocean; plants, animals, oxygen, sand, rocks, etc. Have the students consider what makes the ocean “happy” (or healthy) and how plastic litter will lead to an unhealthy ocean environment. Once complete, have students draw out their “happy” ocean.
- 3) Discuss the ocean promise; to respect the ocean and appreciate what it provides. Ask the students - what does this mean? Why is this important? Have the students discuss what it means to be respectful versus disrespectful to the ocean environment.

Want to start the unit with a bang? Schedule a virtual meeting with the Vancouver Aquarium and get a tour on how plastics are harming the ocean environment. More info at onlinelearning@ocean.org.



RESOURCES (Click on them!)

- OW: *Take the Pledge*
- OW: *Virtual Meeting*
- C3: *Oceans are Life*
- SC: *Understanding our Ocean*
- OW: *Ocean Literacy Course*
- OW: *6 Countries*

“My Ocean Promise is to pick up garbage when I go outside and play.”



LESSON
2
GRADES
2-3

Water is everywhere! It covers 70% of the earth's surface. Of all that water 97% is found in the ocean. There are 5 major ocean basins around the world and all of these basins together form one big world ocean. Water in the ocean is always moving, all around the world. Waves, tides and the rotation of the earth move the water, nutrients and even animals all over the planet. This movement helps to maintain balance in the world, and keeps the planet healthy. In this lesson students will look at how the ocean moves from place to place and carries animals, plants and plastic with it. Students will consider how their own litter can end up in the ocean and take time to consider the three big R's.

Students will be able to:

- ✓ Explain ways water moves around the earth.
- ✓ Understand how the ocean moves plants, animals and objects from one place to another.
- ✓ Differentiate between reducing, reusing and recycling litter.

The earth has one big ocean with many features.

CRITICAL QUESTIONS

How does water move around the planet? How do plastics end up in our oceans? What can we do to stop it?

LESSON GUIDE



Plastic litter knows no borders.

Materials

- Student Workbook
- Pencil
- Gloves and materials for picking up garbage

1) Play the video **How does plastic end up in the ocean?**

2) **Workbook Page 3:** Answer the questions based off the video. After, ask the students to get up and walk around the class and find plastic items – look in their lunches too. Discuss as a group; what did you see? Why was this made from plastic? Could it have been made from another type of material? The key point here is that plastic is EVERYWHERE!

3) Tell the students that they will be going outside to pick up plastic garbage. Ensure they understand what safe garbage is. Tell the students that everyone should try to find at least 3 pieces of plastic garbage if possible.

4) **Workbook Page 3:** Have the students draw the items they found. Play the song **Reduce, Reuse, Recycle**. Discuss the differences between these.

5) **Workbook Page 4:** Have the students complete the chart based on the plastic garbage they found. Ensure the students understand that there is always wiser choice to make when throwing away plastic litter. Go to www.recyclebc.ca (or the program in your municipality) to become familiar with what is and is not acceptable – students will need some guidance as to what is and is not recyclable.

6) Discuss the ocean promise; the importance of picking up garbage outside.

RESOURCES (Click on them!)

- OW: *How does plastic end up in the ocean?*
- OW: *How does plastic end up in the Arctic?*
- OW: *A Year of Ocean Stories*
- CS: *Turning the World into Plastic*
- CS: *Clean Seas Education Pack*

“My Ocean Promise is to do a shoreline clean up with my friends.”



LESSON
3
GRADES
2-3

Students will be able to:

- ✓ Explain what an ecosystem and biodiversity are.
- ✓ Understand the different types of living and non-living things in an ecosystem.
- ✓ Understand how plastic impacts the ecosystem of marine life.

The ocean has a lot of diversity in its plants and animals. These adaptations are based on the ecosystem in which they are living in. In this lesson students will learn about biodiversity and ecosystems. They will have a chance to place different marine plants and animals in an ecosystem and discuss why and how they can survive. Students will then place different pieces of garbage into that ecosystem and discuss where the plastic comes from, who it affects and what to do about it.

The ocean supports a great diversity of life and ecosystems.



Plastic is changing the ecosystems of marine life.

Materials

- Student Workbook
- Scissors and glue

CRITICAL QUESTIONS

How do plants and animals live in certain ecosystems? How does plastic change these ecosystems? Can the animals adapt?

LESSON GUIDE

- 1) Discuss the terms “Ecosystem” and “Biodiversity”.
- 2) **Workbook Pages 5 & 6:** Have the students cut out the images and place the animals in their ecosystem (Do not have them glue it yet!). Come back as a class and ask the students - where did you put this animal? Why? *Note: It is more important that the students have a valid reason for putting the animal there than for them to be exactly right. Allow this to be an exploratory activity.*
- 3) Once students have created their ecosystem, introduce the plastic objects/pictures. Allow students to place them in the ecosystem. Ask the students; Do these belong in this ecosystem? How did they get there? Are they good for the animals? How will the animals react to them?
- 4) Discuss the ocean promise; the importance of a shoreline clean-up and ways to either join one or lead one. *Note: You don't have to live by the shore to take part in this! More information [here](#).*

RESOURCES (Click on them!)

- OW: [Shoreline Lesson Guides](#)
- OW: [Shoreline Clean-up](#)
- OW: [Host a Clean-up](#)
- OW: [Ocean Bridge Leaders](#)
- OW: [Environmental DNA](#)

LESSON
4
GRADES
2-3

“My Ocean Promise is to reduce the amount of plastic in my lunches.”



Students will be able to:

- ✓ Explain what a food chain is and how food energy flows from one organism to another.
- ✓ Place animals in the proper order in a food chain.
- ✓ Understand how introducing plastic will negatively impact the food chain.

Scientists have theorized that life on Earth most likely originated in the sea. The ocean is not only where life is thought to originate but it has also generated much of the oxygen that is required by many of Earth’s organisms. Phytoplankton living in the ocean’s surface waters produce oxygen through photosynthesis. They are the base of the aquatic food chain as they are consumed by zoo plankton, which are consumed by fish larvae, consumed by small fish, consumed by other predators. This lesson will introduce the students to the food chain and will encourage discussion around the flow of energy from one organism to another. Students will also consider how plastic will impact this food chain – especially considering many animals will eat it, mistaking it for food.

The ocean made the earth habitable.

Marine life consumes plastic every day.

Materials

- Student Workbook
- Pencil

CRITICAL QUESTIONS

What is a food chain? How does it work? How does plastic impact the food chain? What happens when one animal is taken out of the food chain?

LESSON GUIDE

- 1) Discuss food. Ask the students; what is your favourite food? What happens if you don’t eat your lunch? Explain how food gives us energy to live through the vitamins and nutrients in it. The same is true for marine life and the food they eat.
- 2) Ask the students if they eat meat or fish. How did these animals get energy to live? What do they eat? Take some examples from the students and draw it on the board. Ex. Student -> Hamburger (Cow) -> Grass. Do several examples with the students until they understand this concept.
- 3) **Workbook Page 7:** Have the students draw arrows to what eats what in the Arctic ocean picture. Once they have tried this individually, go over it as a class.
- 4) **Workbook Page 7:** Have the students discuss in small groups. What happens when plastic is introduced? How will this impact the animals?
- 5) Discuss the ocean promise; I will reduce the plastic in my lunches. Play the video **Reusable Containers** to encourage understanding.

RESOURCES

- OW: *Reusable Containers*
- UN: *Plastic Ocean*
- The *Majestic Plastic Bag*
- OW: *Article: All About Lunches*

“My Ocean Promise is to use reusable water bottles at school and at home.”



LESSON
5
GRADES
2-3

The oceans are the prime regulators of climate, they absorb 90% of the planet’s heat, 30% of the planet’s carbon dioxide and give the planet 50% of the oxygen that we need. Ocean currents allow the ocean to absorb, store and transfer of heat. These abilities allow the ocean to have a major influence on climate. Most rain that falls on land originally evaporated from the ocean. As water evaporates from the ocean it transforms into water vapor that is incorporated into the atmosphere. Some of this water vapor rises and helps to form the clouds from which rain falls. In this lesson, students will learn about the water cycle and will consider the impact of plastic in the ocean on climate.

Students will be able to:

- ✓ Explain the water cycle.
- ✓ Understand how the ocean impacts the earth’s climate and weather.
- ✓ Describe how plastic in the ocean changes the earth’s climate.

CRITICAL QUESTIONS

What is the water cycle? How does the ocean influence the earth’s climate? How does plastic impact this climate change?

LESSON GUIDE

- 1) Discuss how the ocean is the prime regulator of the planet and how this is possible. To help with understanding, show the video **Weather vs. Climate**.
- 2) **Workbook Page 8:** Have the students learn about the water cycle and complete the activity.
- 3) **Workbook Page 9:** Do a science experiment; place two glass jars in the window. Fill both up with an equal amount of water. Place thermometers in both and place a thin piece of plastic (ideally recycled from a bag) over the top of one of the jars. Have the students measure the temperature of the water in both jars – they should be equal. Have the students respond to questions in their workbook. Then have them measure the temperature after two hours and again at the end of the day. Look back at the temperature the next day – has it gone up in one of the glass jars? What does this mean? Make reference to the **Ocean Garbage Patch**.
- 4) Discuss the ocean promise; that water bottles should be reusable.

RESOURCES (Click on it!)

- OW: *How is Climate Change Affecting Arctic Communities?*
- OW: *What happens to your plastic bottle when you recycle it?*

The ocean is a major influence on climate and weather.



Plastic in our ocean is causing the climate to change.

Materials

- Student Workbook
- Two glass jars
- Two thermometers
- Thin piece of plastic

“My Ocean Promise is to re-purpose a plastic I was going to throw away.”



LESSON
6
GRADES
2-3

Students will be able to:

- ✓ Differentiate between physical versus chemical ways of changing materials.
- ✓ Understand the issue of microplastics in the ocean and how they get there.
- ✓ Recognize the 12 most common pieces of plastic litter and what can be done with them.

Our lives are connected to the ocean depths. There are challenges and opportunities in this previously hidden realm, and yet, despite the size and importance of the ocean, less than 10% of it has been explored. The global map of the ocean floor is less detailed than maps of Mars, the Moon or Venus. Still, large organisms in the depth of the ocean are being found with plastics in their stomachs. These come from plastics breaking down, from microbeads in cleaners and microfibres from our clothes. In this lesson, students are going to look at physical and chemical ways of changing materials and how this relates to microplastics in the ocean.

The ocean is largely unexplored.



Microplastics are everywhere!

Materials

- Student Workbook
- Pen or pencil
- Sample microplastics; laundry lint, body wash with beads (If you have it at home already), random piece of plastic



CRITICAL QUESTIONS

What aspects of the ocean have not been explored? Why? What are microplastics? How do they end up in the depths of the ocean?



LESSON GUIDE

- 1) Watch the video: [Microplastics in the Ocean](#)
- 2) Show the students each item (see left) or pictures of them. Ask them – how will this turn into a microplastic? Pass them around. Explain the differences between physical and chemical changes.
- 3) **Workbook Page 10:** Have students write a journal entry.
- 4) **Workbook Page 11:** This is a picture of common items found on the beach. Have the students try to find the items listed. Ask them – How can we reduce these items? How could we reuse them? How can we recycle them?
- 5) Discuss the ocean promise; to repurpose the plastics I was going to throw away. Ensure the student understand the word repurpose – and what this looks like. Here are some **suggestions** to share.



RESOURCES (Click on it!)

- OW: [Microplastics](#)
- OW: [Microplastics Explained](#)
- OW: [The Plastic Invasion](#)
- C3: [Microplastics](#)
- C3: [Finding Plastic](#)

“My ocean promise is to help spread my knowledge about using plastic with others”



LESSON
7
GRADES
2-3

Students will be able to:

- ✓ Relate the cultural importance of water in Indigenous communities to their own value of water.
- ✓ Reflect on their learning on the importance of taking care of the oceans.
- ✓ Demonstrate their learning through the creation of a poster on becoming plastic wise.

Water is not just a resource – it also has a cultural importance to Indigenous communities in Canada. For Indigenous peoples, water is a living thing and a spiritual entity with “life-giving” forces. With this there are certain duties and responsibilities to ensure that it is respected, protected, and nurtured. For Indigenous peoples, water quantity and quality are not only ecological and health issues but also parts of a much broader holistic perspective which recognizes that all aspects of creation are interrelated. Water is not only for drinking but also has traditionally and continuously been used in ceremonies, to grow medicines, and for cleansing and purification. (Excerpt taken from *The Solutions Journal: Found here*). In this lesson, students will consider why water has a cultural significance in indigenous communities. They will relate these to two First People’s Principles of Learning and demonstrate their learning through poster to share with the class and school.

The ocean and humans are connected.

We can all become wiser with our use of plastic.

Materials

- Student Workbook
- Poster materials; paper, markers, etc.
- Recycled plastics for poster (suggestion only)

CRITICAL QUESTIONS

Why does water have this cultural importance in indigenous communities? How does our learning help our community and the land? How can we respect our ocean? How can we help it?

LESSON GUIDE

1) Bring the students into a circle. Discuss the idea that water has a cultural importance to Indigenous communities. Explain that water is used in their ceremonies and has “life-giving forces” and that they believe all aspects of creation interrelated with it. Tie in the First Peoples Principles of Learning; *Learning supports the well-being of the self, the family, the community, the land, the spirits and the ancestors and learning involves recognizing the consequences of one’s actions.*

2) **Workbook Pages 11 & 12:** Students will brainstorm ideas for their poster based on their learning. It should contain 3 aspects;

- a. One way plastic creates a problem in the ocean, *Ex. Sea turtles are mistaking plastic bags for food. This makes them sick.*
- b. A focus on either reducing, reusing or recycling an item, *Ex. We should reduce the plastic bags we use.*
- c. Call to action, *Ex. An ocean promise they discussed or a new one.*

3) Discuss the ocean promise; to spread their knowledge about using plastics wisely with others.

RESOURCES (Click on it!)

- OW: [Reduce, Reuse, Recycle](#)
- OW: [Our Ocean Needs You](#)
- OW: [Virtual Trip to the Vortex](#)
- CS: [Take the Pledge](#)

Rubric for Teachers: Unit Evaluation

This rubric can be used as an evaluation of the student's performance throughout this unit. You will find a similar rubric in the student workbook which the students can also follow.

Engagement in Activities - /20			
Standard of Excellence 17-20	Proficient 13-16	Acceptable 10-12	Not Acceptable 0-9
Students readily engaged in activities and consistently showed leadership in each of the assigned activities.	Students willingly engaged in activities and frequently showed leadership in each of the assigned activities.	Students engaged in activities and occasionally showed leadership in each of the activities.	Students reluctantly engaged in activities and rarely showed leadership in the activities.

Responses / Reflections - /10			
Standard of Excellence 9-10	Proficient 7-8	Acceptable 5-6	Not Acceptable 0-4
Responses demonstrate a thorough understanding of the complexity of the issues. Students develop a sound judgment based on solid evidence.	Responses demonstrate an understanding of the complexity of the issues and the ability to support their opinion.	Responses demonstrate an ability to summarize and restate the key issues.	Responses indicate a lack of conceptual understanding. Issues are dealt with at a superficial level and/or in isolation.

Presentation - /10			
Standard of Excellence 9-10	Proficient 7-8	Acceptable 5-6	Not Acceptable 0-4
Contribution demonstrates a thorough understanding of topic. Effective and competent communication of key concepts.	Contribution demonstrates an understanding of topic. Effective communication of key concepts.	Contribution demonstrates a general understanding of topic. Communication of key concepts is evident.	Contribution indicates a lack of conceptual understanding. Issues are dealt with at a superficial level and/or in isolation.

Thanks to our Partners!

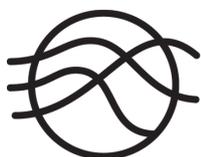


Sea Smart



STUDENTS ON ICE

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