HOW I SEA THINGS...

For me the ocean is my playground, my classroom, my teacher, and my job. It has always captivated me with its complexity and interconnections. Studying the ocean continually leaves me with new insights and more questions. Being able to study the Arctic Ocean has emphasized the importance of our connections to the ocean and how even remote waters are impacted by our actions. This pushes me to ensure that those who come after me can still be inspired by a polar bear hunting on the sea ice, or healthy tropical reef, or a pristine wave crashing over the beach.

- Leah Pengelly, Alberta

Photos: SOI.com

THE BIG BLUE HIGHWAY

The ocean is a waterway, for travel, shipping, recreation and tourism, fishing, research, and defense and surveillance. At any given moment, there can be thousands of boats and ships on Canada’s waterways, and millions sharing the water across the globe. Remember that we said in section 1 that most of the things you buy, use, wear, and even eat, have spent some time traveling to you by water? Why do you think boats and ships are an efficient way of transporting these things around the world?

Let’s compare the pros and cons of four methods of transporting goods to stores and people:

By water – low carbon footprint, cheaper, can ship things anywhere around the world that is connected by a waterway, can transport huge shipments of goods, but this is a slower option

By air – highest carbon footprint, fastest option, but also most expensive option, can transport smaller shipments of goods, a great option for luxury goods, but not for everyday things

By road – can get goods to even remote places that are connected by roads, the roads stop at the water so no way to transport things internationally, high carbon footprint, can transport smaller shipments of goods,

By rail – low carbon footprint, limited to areas that have rail service (like big cities), but not accessible in remote areas, can transport larger shipments of goods.
Over 100,000 years ago
The first type of boat used by humans was really a raft. The raft might have been a floating tree, a bundle of reeds, or even a dead animal. It wasn’t designed to be a raft - humans simply discovered you can float across the water by hanging on to, or climbing onto an already-floating object without having to swim or exert much effort. They would also have used rafts to survive floods. The first “voyages” were probably across rivers, and small lakes to expand areas to hunt for food, and the direction the raft went depended on the direction of the wind and water current at the time.

From 100,000 to 50,000 years ago
Discoveries at Archeological sites in southern Europe show that rafts were used to cross larger bodies of water, like the Mediterranean. Humans were starting to inhabit new areas of land, and rafts were a convenient method of travelling. As recently as the last century, rafts made of inflated animal skins were still being used in some parts of Asia.

From 50,000 to 10,000 years ago
Rafts made of bundles of hollow reeds were used in parts of the world where this type of plant grew, such as in ancient Egypt.

Humans using tree trunks as floating rafts observed that hollow trees floated better than solid ones. The hollowing-out would have been caused by insects eating the inside the tree as humans hadn’t yet invented tools to cut, hollow out or shape wood.

From 10,000 to 2,000 years ago
It was during this time that rafts became boats. This means they started to have a shape that made them easier to travel through the water.

As humans started using more sophisticated tools for hunting, they also used items such as animal bones for cutting skins and wood. This meant logs could be hollowed out by hand to form what we call the “dugout” canoe. At the same time, especially in the far North, humans started to make boats out of animal skins stretched over frames of animal bones. This boat construction method was simply copying what Man had observed in animals. After all, their skin (as is ours) is stretched over our skeleton to form a watertight seal.
A refinement of the dugout canoe is the birch bark canoe of the First Nations peoples of Canada.

During this time, methods of propelling these boats through the water developed. Paddles or poles were used, rather than just using hands. And the idea of capturing the wind in a sail to blow the boat along developed too. Early sails were likely made from broad palm leaves and were first known to be used in the Middle-East.

A further development of the paddle was the oar. An oar is basically a mechanical lever that increases the power of a man’s arm and transfers it into the water to move the boat forward. The ancient Egyptians of this era perfected this new propulsion method. Oars also started to be used as early rudders.

The Romans also built strong and capable warships of wood, some with several decks of rowers sitting one above the other to give awesome propulsion power.
In recent time
The coming of the Industrial Revolution in Europe, almost 400 years ago, triggered another huge change in the way boats and ships were built. Wood was gradually replaced as the main shipbuilding material by iron and then steel. The invention of the steam engine and propeller meant sailing ships became less efficient to transport cargoes around the world – and they only remained in use for certain things, such as in certain fisheries – like Canada’s Bluenose schooner.

The famous Canadian Bluenose Schooner
Image source: https://www.thecanadianencyclopedia.ca/en/article/bluenose

The use of boats for recreation is really a very recent event. As an increasing number of people had more time to relax on the water, the demand for yachts and motor boats increased. Building materials for pleasure boats changed too – wood largely being replaced in the mid-1900s by fibreglass.

Today, most boats are built of what’s called “composites”. This includes fibreglass, or carbon fibre and Kevlar for boats that need to be stronger, but light in weight.

What main lessons have we learnt about boat design after all these years?
The main thing to understand is that over the past hundred thousand years, boat types and shapes have evolved to match the local waters, the available building materials, and their intended use. This is still the case today.
ACTIVITY: WORD UNSCRAMBLE

Here are a few different types of water vessels. See if you can unscramble the letters to figure out the different vessels in this list. Can you match them to their image?

YRDO _ _ _ _
GHNIFSI TABO _ _ _ _ _ _ _ _ _ _
ESRICU PHIS _ _ _ _ _ _ _ _
ELATBT SPIH _ _ _ _ _ _ _ _
CIE KREABRE _ _ _ _ _ _ _ _
URDGATCAOS ISP _ _ _ _ _ _ _ _ _ _ _ 
TISALOAB _ _ _ _ _ _ _ _
ANACTRAMA _ _ _ _ _ _ _ _ _ _
EINMRABUS _ _ _ _ _ _ _ _ _ _
OCERINTA IHPS _ _ _ _ _ _ _ _ _ _
YRFRE _ _ _ _
CRHIB ABRK EONAC _ _ _ _ _ _ _ _ _ _
NIGYD _ _ _ _
YKAAX _ _ _ _

Why do you think water transportation is especially important to societies globally?
**BOATS AND SHIPS HAVE LOTS IN COMMON**

These two water vessels may not look much alike, but they have a lot in common.

We’ve listed some common parts of a vessel below. See if you can identify them on each of these boat images above.

- **Hull:** the body of the boat
- **Beam:** The width of the boat, at its widest point. Usually, a wider beam means a more stable boat.
- **Bilge:** A compartment at the lowest point of a boat’s hull that often has water in it.
- **Waterline:** Where the boat sits in the water.
- **Keel:** The backbone of a boat. It is the lowest point of the boat’s hull. Like our own backbones, the keel provides strength, stability and prevents sideways drift of the boat in the water.
- **Main deck:** the flat part of the boat or ship above the hull
- **Superstructure:** the part of the boat or ship built above the hull and the main deck. This is where the view is best.
- **Propulsion system:** this is the propeller or other system that propels, or makes the motorized boat move.

**WHEN BOATS TAKE FLIGHT! : THE HYDROFOIL**

Did you know that the first successful hydrofoil was built right here in Canada – in Baddeck, NS – by Alexander Graham Bell? Along with his wife Mabel Bell and the engineer F.W. Casey Baldwin, they designed a watercraft with hydrofoils, or small rails, that lift, just like an airplane’s wings, when the craft gains speed. This ‘lift’ literally lifts the hull of the boat off the surface of the water, which reduces friction and allows the craft to travel at greater speeds.

[Watch this video which explains how a hydrofoil works.](#)
Here’s another great YouTube video showing hydrofoils racing in the America’s Cup

CAREER PROFILE: ELECTRICAL ENGINEER & SHIP DESIGNER

In ship design, there are some people who specialize in ships from the beginning of their training, but there are also many other jobs that are done by people whose training wasn’t dedicated to the shipbuilding world.

That describes me – I’m an electrical engineer. I design the electrical equipment and systems that go on ships. This can be the main propulsion motors of modern electric-drive ships, but it can also be the ship’s computer system, its radars, its phones, its fire alarm system, its navigation lights, or the electric heaters that help keep the railings from getting covered in ice during a winter storm. Electricity is everywhere on a modern ship, and it’s my job to figure out how to get it there, so it can do its job.

I’m originally from the Pacific coast – a small town called Bella Coola. After high school, I studied Electrical Engineering at the University of Toronto. My first technical job after university was designing and testing electrical switchboards with a small company in Newfoundland. Soon after learning the ropes there, I was recruited to co-ordinate electrical engineering at one of the world’s major international shipyards – Ulstein Verft, in the small town of Ulsteinvik, Norway. That was a fascinating job, watching an enormous ship take shape outside my office window – and knowing that the work I was co-ordinating was making it all possible!

I returned to Canada in 2011, and have worked on ferries, Naval ships for the Arctic, clam fishing boats, pilot boats, solar-powered tourboats, and an enormous tidal-energy turbine project. I live in Halifax.

Over my career, my work has taken me to nine countries, the shores of three oceans, and I get to watch with pride as ships I’ve worked on sail past the window of my house in Halifax all the time. It was incredibly rewarding work. I say “was”, because after 15 years of doing that work, and loving it, I’ve decided to go back to school to learn how to become a teacher, to teach future ship designers – when they’re in high school.
SHIP-SHAPE!

Contributed by Ashley Morton, Ship Designer

“Shipshape” used to be a common term to describe things being organized and tidy, with everything in its place – like your room, right? But what shape is a ship? And why?

Part of a ship’s shape is set up by the simple fact that it has to float – it’s kind of a big wood, fibreglass or metal bubble, floating on the water – but it needs to stay with the up-side up, and the down-side down.

But people figured out how to do that part thousands of years ago, all over the world. So why do today’s ships and boats have so many different shapes?

Think about the kind of questions you might ask if you were asked to design a ship:

- What work does the ship need to do?
- How many people need to go on this ship?
- How long will the ship be away from land?
- What kind of weather will the ship need to be able to travel in?
- Will there be ice on the water that the ship is travelling on?
- How will the ship be powered? (Sail? Oars? Diesel fuel? Solar-generated electricity?)

All those questions are important, but the starting point is often the first one – what does the ship need to do?

Look at this ship. Why do you think that it has a low, flat section towards the back (the “stern”, in ship-speak)?

The first one is a type of vessel called an “Offshore Supply Vessel” – It travels back and forth from land to offshore platforms, bringing cargo and equipment. The second one is a lobster fishing boat. It travels back and forth from land to fishing grounds, carrying lobster traps on its stern.

Both of them have to be able to have a lot of weight loaded on to them, and they want to keep that weight pretty low down, to make sure that the ship doesn’t become unstable and tip over. They end up looking a little bit like “pickup trucks on the water”.

In what other ways are these two vessels similar and different?

So does this one, even though it’s much smaller:
But there are hundreds of other different types of ships and boats in the world, and they all have shapes that are determined by what they're trying to do.

Can you think of how your ship would need to be shaped if you needed ...

1) to have cars drive on and off it?
2) to tow something heavy behind it?
3) to be able to go backwards as fast as you went forwards?
4) to be able to break through ice?
5) to be able to carry absolutely as much cargo in containers as possible?
6) to be able to carry cargo that was liquid like oil or chemicals?
7) to travel through very shallow water?
8) to travel under very low bridges?

Activity:
Number each one of the ships or boats here with one of the jobs listed above.
Gravity versus buoyancy - Gravity is constantly acting upon us, pulling us down to earth. But in water, another force is at play that keeps us from sinking straight to the bottom of the water. It’s called Buoyant force, and it’s an upright force. When objects float in the water, the forces of gravity and buoyancy are in equilibrium – which means they are in balance. Ship design must always keep these two forces in balance.

- Gravitational force on an object (the pull of the Earth) is a downward force that pulls us to the Earth.
- Buoyant force is an upright force that acts on objects in the water.

Other considerations for keeping boats and ships afloat

1. Stability - Ships and boats in the water are constantly in motion, even when they’re anchored or tethered to a dock. That’s because water is always in motion, with currents and tides, wind and storms keeping it moving. So we need to think about stability. Stability means simply, keeping the up-side up, and the down-side down.

2. Seaworthiness - This means that a vessel is safe to travel on the water. This means that it will right itself if a wave tips it over, and that it won’t take on too much water to stay afloat. When you design your vessel, you will also have to ensure that the material you use is waterproof, because soggy is definitely not seaworthy.

3. Load - all boats and ships carry something – be it people, or cargo, or vehicles. Think about how load affects stability? Do you want the heaviest load up top in the superstructure, on the main deck, or down in the hull?

4. Plimsoll Line - The Plimsoll Line, is a line on the outside of a ship or boat or that shows how low in the water it can safely travel. By adding more ‘load’, the vessel sinks lower into the water. The Plimsoll Line will change depending on the water conditions (temperature, fresh water and sea water). Most boats use a different coloured paint to indicate the Plimsoll Line.

Have a look at these images and decide which one looks most stable and buoyant? Where would you put the load?
How purpose informs design

So now we know that purposeful design means that the vessel design is determined by the purpose or use of the vessel. But what else needs to be considered when choosing a vessel design?

Well, it’s important to know the type of water it will be in (salt water, fresh water), how much load it will carry, what type of load it will carry (liquids, solid goods, people), the type of water conditions it will travel in (deep ocean waves, narrow rivers, ice), the duration of trips (quick back-and-forth like a ferry, or weeks at sea like a Navy vessel), and what type of equipment (like research equipment, helicopters, combat systems, or fishing gear) or systems it will need.

Using the information above, and clean materials from your recycling bin, design and build a simple vessel. Keep the vessel purpose in mind as you plan your design. Use materials available, including clean materials from your home recycling, along with duct tape and a glue gun. Design and build a hull and superstructure (i.e. Captain’s Bridge or living quarters) that will float, that can support a load, and that remains stable, buoyant, and seaworthy in turbulent water.

**Stretch your skills:** For a more challenging build activity, [click here](#) for instructions on how to build a model of an Arctic Offshore Patrol Ship (AOPS) ([click here for the COVE shipbuilding activity](#)).

**Activity 1:** Take a clean plastic or glass bottle (be careful with the glass) with a lid. Fill it half-way with water, close the lid, and see if it floats. Imagine that the top half of the bottle is the main deck, so we want to keep that out of the water. The water inside the bottle is the ‘load’. How much load can you put inside and still keep the bottle afloat? Using a marker, draw the Plimsol Line on the bottle to show where it floats best in the water.

**Activity 2:** Take the water bottle that drew your plimsol line onto. Is it stable in the water or does it roll freely? Can you imagine what would happen if you were on a boat that rolled freely? What can you do to the water bottle to make it float with more stability? Share your design with us on Instagram [here](#), [Tag us @cove_workforce](#).

**Design Thinking Challenge**

It is a ship currently being built in Halifax, Nova Scotia by Irving Shipbuilding Inc. Like the AOPS, this is a team build, so work with a parent or sibling. This activity was designed by an engineering team from Irving.

**Test your vessel in the sink or bathtub.**

• Does it float? • Is it stable?

• What happens if you add load to it?

**Extension Activity:** Take a baggie and fill it with sand or stones or marbles. This is your ‘load’. Position the load on your ship where you think it will be most stable and least stable.
Over 90% of the world’s trade is carried on the sea. Ships of various types carry goods in ships holds or containers to all parts of the world. But how do those goods reach your home or to the industries that need to turn them into useful items that you use? Ships must come to Ports and ports must be safe, secure and efficient. Ports employ many people directly doing jobs like Port administration, pilots, tug drivers and stevedores but also just as many if not more indirectly have jobs around ports like truck drivers, container packers and unpackers, surveyors, and engineers. Because of this our Ports are very important to the economy of the country and very important in generating jobs for the future. Ports were originally established as part of the first settlements of many countries and therefore are often found close to cities. Originally this was important as it would take too long to move goods inland.

Today goods are loaded or unloaded from ships and may travel many miles by truck or rail from its origin or to its destination. The Ports however continue to grow as the city around them grows. It is important that Ports and port cities learn how to grow together in a sustainable way.

The Port gives a Port city its identity, culture and heritage but as it grows it needs to ensure that it can do so without impacting unfairly on the lives of those who live near it. It is very expensive to move a Port to a new location and this would make our goods that we buy very expensive but smarter ways of doing things and new technologies allow ports and cities to coexist while growing together. New technology that allows the port to monitor its environmental footprint or be more efficient in the way goods pass through it make this all possible.
Design and build a crane to lift containers onto and off of vessel.

You will need:

• Some different weights (you can use baggies and fill them with different amounts of ‘cargo’ like sand, marbles, or dried beans)

• Something round for a pulley system (like a spool of thread or a clean can or bottle)

• Thread or yarn

• Some kind of hook (you can make your own from a paperclip)

• Some sturdy material for your crane, like wood, strong cardboard, a tall plastic bottle

• A sturdy base to mount your crane on, like a piece of wood

What to do:

Design a crane that uses a pulley system and levers to lift a heavy weight from one place and move it safely to another place (or use it to load ‘cargo’ onto the ship you have built – without tipping or sinking the ship). You might want to check out some simple pulleys and levers online to get some ideas. Share a photo/video of your design here.

Mistakes we’ve made and how we’re using information and technology to do better

One way to help keep oceans clean and its resources sustainable is to not contaminate the water where our seafood comes from. The lowest, or bottom section of a boat is called the bilge, and is designed to collect excess water. On vessels of virtually any size, a pump inside the bilge performs a very important function: it removes water so the boat doesn’t sink. Boat engines and fuel tanks are often located in the bilge and when they leak oil, fuel and grease (known as hydrocarbons), they get mixed in with the water and are also pumped overboard. GreenOil provides a very unique bilge water filter system that removes hydrocarbons from the bilge water before it is pumped overboard.

As more and more boats install these systems, we can help keep our oceans clean to provide the highest quality seafood possible.

Industry at work solving the problem of bilge water

Greenoil: With an estimated 4.3 million boats in Canada, if each boat pumped just 1/2 litre of hydrocarbons per season, that would equal more than 2 million litres of contamination per year. The legal contamination level in Canada is 15ppm, meaning 15 litres of hydrocarbons will contaminate 1 million litres of water. So, over 2 million litres of hydrocarbons could contaminate over 133 billion litres of water!
Here are some other people who are already working in the Blue Economy.

**Red Seal Journeyman Joiner / Boat Builder / Carpenter / Furniture Maker**

I fell in love with boats when I was in high school. I grew up working with a sail training organization in Toronto called ‘Toronto Brigantine’. I always knew I loved being around the water and wanted to learn more about building and repairing boats so after I finished university I went to college and took a fine woodworking program. It taught me a lot about using tools correctly and methods of construction. I love building and designing furniture, but I always knew my goal was to work with wooden boats. I felt and still feel if you can build boats you can build anything. After college I applied to all the wooden boat shops around until one agreed to take me. I learned most of what I know from working on the job. Boatbuilding and woodworking in general, as I have worked building furniture, fine interiors and carpentry, is all about solving problems. Wood is a very unique medium as it is always moving and changing. There is constantly some new challenge to overcome or construction detail to consider, it keeps you on your toes and always learning. I love it and use the skills I have gained in my career, including confidence with tools, problems solving skills and thinking outside of the box, every day of my life. I couldn't imagine it any other way."

- Erin Philp

**Journeyman Wooden Boat Builder**

“Wooden Boat Building was something which was passed down to me in my family and has come to represent for me continuance; meaning it is a craft and a practice that can survive for throughout time for many reasons. Wooden boatbuilding is a trade which encourages a community to work together and requires a whole team of people to live and work in a way which supports everyone involved; starting with the arborist, then the sawyers, then the iron workers, a boat builder or shipwright & many others.

It is a trade that can only continue, and has continued through generations because it can be sustainable; meaning we work with the environment, and take only what we absolutely need, and leave plenty for others. This makes sure that wooden boats are an industry which will always be here waiting for you!"

- Andrew Rhodenizer
Sailmaker’s Assistant, NSCAD graduate

“Coming from Alberta, I never thought too much about the ocean until I moved to Halifax to go to Art School. I was instantly hooked! I soaked up information about boats and worked on them whenever I could, just doing small jobs. Sail boats did, and still do feel like a little bit of magic to me. What I do now, Industrial Sewing, is just sewing on a larger scale! For boats! I use a big strong sewing machine to get through thick fabrics, and I get to do lots of fun rope work and hand sewing! Before I was hired as a Sail Maker’s Assistant, I did not have any formal training, but had a bit of sewing experience and was willing to try it out! I learned much of what I know about the trade while doing that work, and it allowed me to strike out on my own & work for myself at home! I like this trade because I get to work with my hands, see & learn about lots of different boats & know their stories, and make them sewn items to protect them from the weather! It requires me to think visually (which I love), and solve problems with materials and shapes which my Art School training really helped me with. I never thought I’d end up doing what I do, but I’m very glad I found it by trying, asking lots of questions, and constantly learning more.”

– Erin Robison, Marine Industrial Sewist and Ocean-Based Artist

THE NAVY IN THE BLUE ECONOMY

I grew up near Montreal, far from salt-water, 1000 miles from the sea. I first read about the sea as a schoolboy and would see navy and coast guard ships on the St Lawrence Seaway. It would lead me to join the Navy through a scholarship which paid for my university education. During the summer I trained at sea on both coasts. I spent a career in the Navy - fifteen years at sea - years interspersed with periods ashore training and working in Halifax, Ottawa, London and Brussels from where I retired as a Vice Admiral.

The Navy is full of fun and adventure. It exists to protect our country and our way of life and the lives of many people around the world. It’s about traveling the oceans of the world with young Canadian men and women in modern, high-speed ships, submarines and aircraft. The Navy shares the ocean highway with fishing vessels, merchant ships, research vessels and oil and gas rigs. It’s about using computers, radars, sonars and other high-tech equipment. It’s about learning to fire guns, missiles and torpedoes and to use rifles and pistols safely and effectively in the protection of yourself, your ship and your shipmates. It’s about getting closer to the environment and sea-life in the oceans and carrying out research and observation to preserve them. It’s sharing in exciting work, friendship, laughter, fitness and lots of good food. Finally, it’s all about making a difference in this beautiful world of ours. It’s not for everyone but it might be for you.
**CAREER PROFILES: SHIPBUILDING**

I grew up about ten kilometers from the ocean. As a young boy, I would go to the beach and dream of sailing on a big ship around the world to new and interesting places. When I was thirteen, I bought a small sailboat and taught myself how to sail. I learned everything I could about the tides, waves, and wind and their effect on a boat. It fascinated me.

When I graduated from College, my love for the sea carried me into the Navy where I served on both submarines and surface ships for 36 years. I traveled all over the world in the Navy, from the bottom of the ocean to the top of the world in Tibet. I studied Naval Architecture and eventually became the head of the U.S. Navy’s ship design and construction activities.

After I left the Navy, I learned about the Royal Canadian Navy’s effort to restart shipbuilding in Halifax, Nova Scotia. I wanted to be part of bringing back shipbuilding to a terrific Maritime community. I have been building ships in Halifax now for seven years and I still get the same sense of wonder being around the ocean and ships as I did as a young boy. I am convinced that my love for the sea and my early years learning to sail had a profound and very positive influence on the direction of my life.

Kevin McCoy  
Vice Admiral, U.S. Navy (retired)  
President, Irving Shipbuilding

When I was young the sea seemed all around me. I lived and played on the shores of Bedford Basin, Halifax. My dad was a sailor who fostered in me a curiosity for what lay over the horizon. He taught me that sea lanes connected my world to places like the Pyramids of Egypt, the jungles of the Amazon River, and glacial fjords in the Arctic.

There was a book I devoured called *Men, Ships and the Sea*. It depicted the awesomeness of the ocean in photographs and art, telling the story of humankind’s relationship with the sea through exploration, trade in boats, harvesting of seafood and sadly even the pursuit of conflicts at sea. Another book was *Nansen’s Farthest North*, the tale of an explorer who drifted in his small ship entrapped in the Arctic ice to see if the winds and currents would push him to the North Pole. It expresses our desire to explore the mystery of the oceans that even today barely reveal their secrets. And finally, in my home hung an ominous painting entitled *Women and Children First*. It depicted a shipwreck in the age of sail that highlights that work at sea is a challenging endeavor.
For 35 years, I worked on the oceans of the world, respected the power of the sea, was wowed by the science of oceans and climate, and never stopped learning and discovering. I believe that Canada is a great maritime nation and has an important voice in everything to do with the world’s oceans.

John F. Newton  
Rear Admiral, Royal Canadian Navy (retired)  
Managing Director, Fleetway Inc. (we fix ships)

My whole life has been spent in, on, and around the water. Growing up in Nova Scotia, I have so many fond memories of playing in the ocean, ducking in and out of the waves. Later, as a national team paddler, I spent hours upon hours in a kayak, propelling myself across countless bodies of water. Whether at home, at training camp, or travelling all over the world to race for Canada, I always find myself drawn back to the ocean. I would train and compete on lakes, rivers, and canals, but if I need to relax, I’ll find my way to the ocean. Watching the waves roll in and out is calming and peaceful, and always brings me back to my childhood.

After spending over 20 years kayaking, I’ve traded in my paddle for a pen. Now working in communications for Irving Shipbuilding, I have the pleasure of telling the stories of our 2,000+ shipbuilders who are building ships for Canada. Knowing that the work done at Halifax Shipyard will support the Royal Canadian Navy on oceans around the world for decades to come makes me immensely proud.

Hannah Vaughan  
Canadian National Team Kayaker (retired)  
Senior Communications Specialist, Irving Shipbuilding
HOW I SEA THINGS...

Before I had gone on my first ever Sea School trip, I wasn’t very keen on trying new things and putting myself out there. But by experiencing the teamwork, comradery and, at first, hard work that comes with Sea School, I recognized that throwing myself into new situations was not only great fun, but also a healthy way of expanding your own boundaries and learning about the world and about yourself. I made some lifelong friends and had experiences that have taught me some very valuable lessons. Sea School will always hold a big place in my heart and I encourage anyone to best their hesitations and fears to try new things and just go for it!

-Liam Oland, 19

MARINE SUDOKU

Here are two sudoku puzzles to try to solve. One is trickier than the other – ask a sibling, parent or friend to help you get started.

Complete this sudoku using the letters from the word **m-a-r-i-n-e** instead of numbers. You may only use each letter once in each coloured square, in each vertical column, and in each horizontal row.

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Complete this sudoku using the letters from the word **s-e-a u-r-c-h-i-n** instead of numbers. You many only use each letter once in each coloured square, in each vertical column, and in each horizontal row.

Check your answers:

![QR Code](image)

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About COVE:
COVE is a world-class facility for applied innovation in the ocean sector and the only such hub of its kind in the world where start-up companies, small and medium sized enterprises, large firms and post-secondary expertise are housed together developing ocean technology. COVE Workforce Initiative focuses on workforce development and engagement in Ocean Industries where youth and teacher engagement is a primary focus. COVE brings together people, ideas, industry and research to help our community and members work in new ways. Together, we are a catalyst in creating the world’s next practical, commercial and revolutionary ocean tech advances. Irving Shipbuilding, as part of its Value Proposition commitments under the National Shipbuilding Strategy (NSS), has invested over $6 million in COVE to support development of the programs and operations. Learn more about COVE, our projects and our members at coveocean.com

Jim Hanlon, CEO of COVE
As the son of a navy commander, I developed a curiosity for the ocean from a very young age. When I was just 5 or 6, we were living in Victoria, BC, where my father was stationed, and he took me down to the port and showed me a jet-powered catamaran! It was amazing – and my attention was grabbed. I eventually became an electrical engineer, and while I could work in any industry, the ocean was where I saw the most interesting opportunities. For years I lived and worked around other ocean tech entrepreneurs, and eventually I bought my first ocean tech business in my late 30’s. Now, at COVE, I help other ocean entrepreneurs to start and build their businesses. I still find it fascinating – this is an industry for the curious and inventive – it’s an industry where people with many different skills can come together because the issues and opportunities of the ocean are so intertwined, so untouched compared with other industries. And COVE is a place where other ocean entrepreneurs come to bring their ideas to life.
The first time I saw the ocean in real life I was 9 years old. I had grown up hundreds of kilometers from the coastline but a family vacation took me to the beaches of the Pacific. I was nervous at first about stepping into the waves. I had seen enough shark movies to feel certain that the ocean was a deep and dark pool of biting teeth and stinging tentacles and slithering serpents. But, my curiosity won out over my imagination and I tugged on a mask and snorkel and bravely waded in.

I felt the pull of the tide at my feet drawing me deeper. I fitted the snorkel onto my face, squeezed my eyes shut, and dipped my face down for a first breath beneath water – and was surprised when my lungs filled with cool air. The snorkel worked! And then I opened my eyes...

I saw sea grass dancing slowly, I saw fish – so many fish – all around me. And what really struck me was the quiet. All I could hear were my own slow deep breaths. Bubbles floated gracefully past my face. I saw nothing scary. No teeth. No stinging tentacles. Nothing slithered. It was an aquamarine scene of calmness. It was a whole new world that I had never been aware of. And in that moment – I was hooked. I knew I wanted to explore the mysteries of this great water-world.

I once was asked to think about a place where I felt the most relaxed and at peace. Without hesitation, I knew it was being in the ocean watching and observing a whole other world. When you are underwater, you realize how small you are in the larger ecosystem. You see all the other animals and plants who have evolved to spectacularly survive in the ocean. You learn that the ocean holds so much history, science and opportunities and we have so much yet to discover! The ocean has always been my favourite place, and as I got older I knew I wanted it to be part of my career so I could share my passion about it and get others just as excited as me.