National Science Week: Deep Blue

A note to Leaders

National Science Week runs from August 15 to 23 and this year's theme is "Deep Blue: innovation for the future of our oceans".

Select from the following activities to help your Scouts explore the mysteries of our oceans and become fascinated with understanding and protecting this precious resource.

We are about to enter the United Nations Decade of Ocean Science for Sustainable Development. We can remind our youth members that by respecting and protecting our oceans we are upholding WOSM's commitment to the Sustainable Development Goals and upholding our own commitment to the Australian Scout Law.

Make a marine creature

Get involved in the National Science Week Deep Blue Marine STEAM competition by making a marine sea creature. Here is a brief description of the challenge taken from the National Science Week website:

"Get creative with craft materials, paint and items from around your home and backyard to design and make a marine creature. Be inspired by researching marine creatures online or in books. Your design process should consider your marine creature's physical size and features, defence mechanisms, diet and habitat. Your design may be based on a real-life creature or an imaginary creature. The deep blue is the limit."

Equipment suggestions:

- Recycled packaging that has been cleaned
- Coloured paper
- Pencils/textas
- Scissors
- Sticky tape and glue
- Sticks, leaves, rocks etc.

Check out the website for details on how to enter your marine creature in the competition to win great science prizes.

https://www.scienceweek.net.au/event/deep-blue-marine-steam-competition-for-3-10-year-olds/

Saltwater versus Freshwater

What is the difference between saltwater and freshwater?

Saltwater density experiment

Start with the saltwater density experiment (see instructions below) to explore the differences between saltwater and freshwater.

You could do this as a demonstration or send out the equipment list in advance so that youth members can try this for themselves. This would be a great activity to give a youth member a chance to lead.

The basics of freshwater

Who has tasted saltwater before? Could we live from drinking saltwater? Discuss these questions then watch this short video that explain how much freshwater there is on Earth.

https://www.youtube.com/watch?v=oaQCiwzjnCM

Water distillation experiment

The energy from the Sun powers the water cycle. As it warms up, water evaporates from the ocean, leaving the salt behind. The water vapor cools down in the atmosphere and condenses back into a liquid, returning to the Earth as rain, hail, sleet or snow. The water is now fresh and safe to drink.

Perform the saltwater distillation experiment (see instructions below) to turn salty water into fresh water using evaporation and condensation just like in the water cycle.

Ask the Scouts how they might adapt this technique in a survival situation? What other techniques can we use to make water safe for drinking?

Cleaning up the oceans

There are lots of different causes of water pollution and the National Science Week team want our help coming up with ideas to help others understand the effects of pollution and waste in our oceans and empower them to know what they can do to counter those effects.

Investigate

It is estimated that one million seabirds and 100 000 other marine animals, including birds, turtles, seals, whales, dugongs and countless fish, are killed as a result of plastic litter every year. Somewhere between 50 and 80 million plastic shopping bags enter the Australian environment as litter every year.

Watch the Plastic Oceans video on You Tube (1 minute).

https://www.youtube.com/watch?v=otLUQR7YeCM&feature=youtu.be

Brainstorm together some ways that we can care for the ocean, for example:

- Scrape left-over paint back into paint pots and not wash paint brushes near drains.
- Wash cars on lawns.
- Sweep leaves away from gutters and use them as mulch.
- Put litter in a bin.
- Pick up after our dogs and compost doggy poo.
- Reuse plastics.
- Stop releasing balloons.
- Never dispose of oil or chemicals down the gutter or into a drain.
- Identify areas in and around the school and children's homes where water is found.
- Discuss any environmental issues connected with those areas.

Choose some of these other videos to look at different strategies for cleaning up our oceans.

- 9 ways you can help reduce plastic pollution - https://www.youtube.com/watch?v=Hu-flLevV40&feature=youtu.be
- Microplastics - https://www.youtube.com/watch?v=EfEF8GNv4UQ&feature=youtu.be
- Straw No More (Molly Steer) - https://www.youtube.com/watch?v=Rr5Py1r9xjw
- Edible spoons - https://www.youtube.com/watch?time_continue=2&v=9g1vy7yyGVk

Clean up campaign

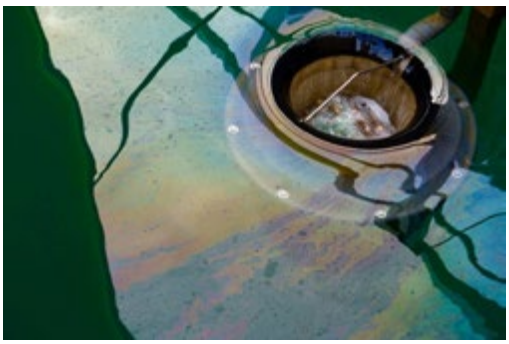
Split into patrols or smaller groups in breakout rooms. Each group needs to come up with a jingle or skit that could be used to convince people to make better environmental decisions to improve the health of our oceans. Set a time limit for this activity then return to the main room to watch each group perform. If your Scouts respond well to competition you could consider setting up a Zoom poll so they can vote for their favourite performance at the end.

Where to from here? Brainstorm how your Unit could act to make a difference to ocean pollution.

Ocean Technology Model

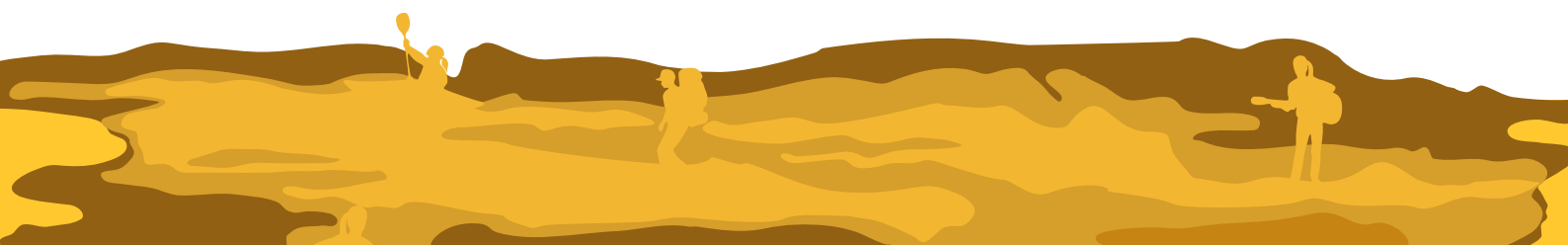
Scientists are trying innovative solutions to clean up the plastics already in the ocean. Boylan Slat had made a giant floating tube which can float around in ocean currents and capture plastic and other floating garbage.

The Seabin program being trialled in Sydney Harbour should filter 4.3 billion litres of water in 12 months and remove 28 tons of microplastics.



Using Lego (or other construction resources) ask Scouts to design and construct a new device that will help to clean up ocean pollution. They should be able to demonstrate how the device would work in water (eg. sink or bathtub) with miniature pollution samples (eg. small piece of plastic or paper).

How can we promote the 'Social' part of SPICES in an activity like this? Put the Scouts into patrols or smaller groups and ask them to complete the design process together. Each Scout still needs to build a model based on the collaborative design. This makes the activity more challenging as Scouts will need to communicate effectively for their models to look the same. Tell the patrols beforehand that you will be looking not only for design creativity but also for the cohesiveness of the group's constructions.



Ocean Quiz

Scouts love a good Kahoot quiz and there are already some great Ocean themed quizzes ready to go on Kahoot. Create an account and look for the 'Ocean Wonders' quiz by National Geographic or 'How does climate change impact the ocean' by Columbia University. There are also many good 'Ocean Animal' quizzes on Kahoot or you might like to ask some youth members to create their own ocean themed Kahoots before the meeting and run this activity.

Warn Scouts in advance that they will need a second device or a computer so that they can access Zoom and Kahoot at the same time. The leader hosting the Kahoot will need to screen share in Zoom so that Scouts can see the questions.

More National Science Week Activities

There are a number of free online National Science Week events open to the public that are being hosted by different community organisations. These events are all great opportunities for Scouts to participate in the Community Challenge area.

Joey Scouts and Cub Scouts might enjoy these Marine Science presentations from the Gold Coast covering different topics such as 'The secret life of a nudibranch' or 'Marine Biologist Field Day'. Follow this link to register for these free events https://www.goldcoast.qld.gov.au/libraries/science-innovation-tab-whats-on-279.html

Older Scouts and Venturers might be interested in these careers in STEM presentations for secondary school students.

- Virtual Inspire in 5 – Saturday August 15
- https://www.scienceweek.net.au/event/virtual-inspire-in-5/
- Super STEM Careers Q&A - Wednesday August 19
- https://www.eventbrite.com.au/e/super-stem-careers-qa-registration-113714978562

SciScouts' Destination Moon and Beyond (Online) event is being run on **Saturday August 15** in collaboration with Fizzics Education! While the Zoom tickets for Destination Moon & Beyond have sold out, you can still watch the Facebook Live broadcast via the SciScouts, Young Stars and YMCA Canberra Space Squad Facebook pages. Take your pick, as it will be broadcast simultaneously.

Activity instructions: Saltwater density experiment

Equipment:

- 2 cups of water
- 2 identical glasses/jars (larger than the water cups)
- Water
- Half a cup of salt
- Red and blue food colouring
- Spoon

What to do:

1. Make predictions about which would be heavier (more dense), freshwater or saltwater.
2. Add some blue food colouring to one of the cups of water, stir it with the spoon until the water is completely blue.
3. Repeat this by adding the red food colouring to the other cup of water and use the spoon to stir it.
4. Add the salt to the red water and stir it to help the salt dissolve.
5. Pour half of the blue coloured water into one of the glass jars and half of the red salty water into the other jar.
6. Slowly top up the jar containing the blue water with the remaining red coloured water.
7. Then, carefully and slowly pour the rest of the blue water into the jar containing the red salty water.
8. Let them sit for a while and observe what happens.

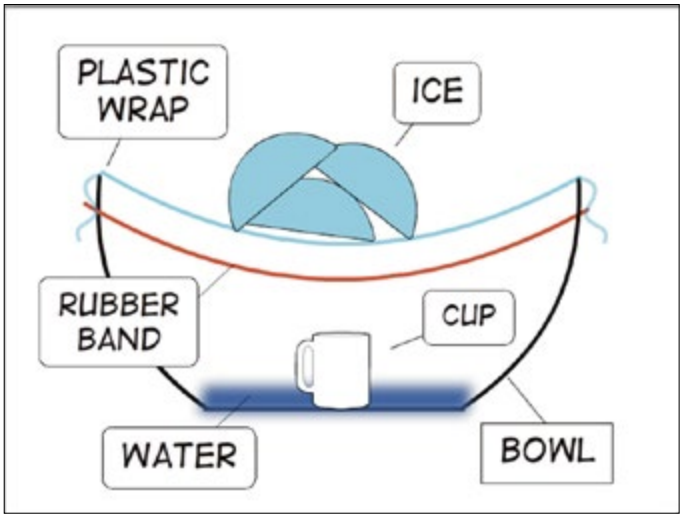
How it works

Adding salt to the water makes it denser. In this activity, the 'red' water contains the salt, and when it is poured on top of the 'blue' water, it sinks through and the colours mix. When the solutions are poured the other way around (the 'red' before the 'blue'), the non-salty water floats on top because it has been placed on a liquid with a higher density.

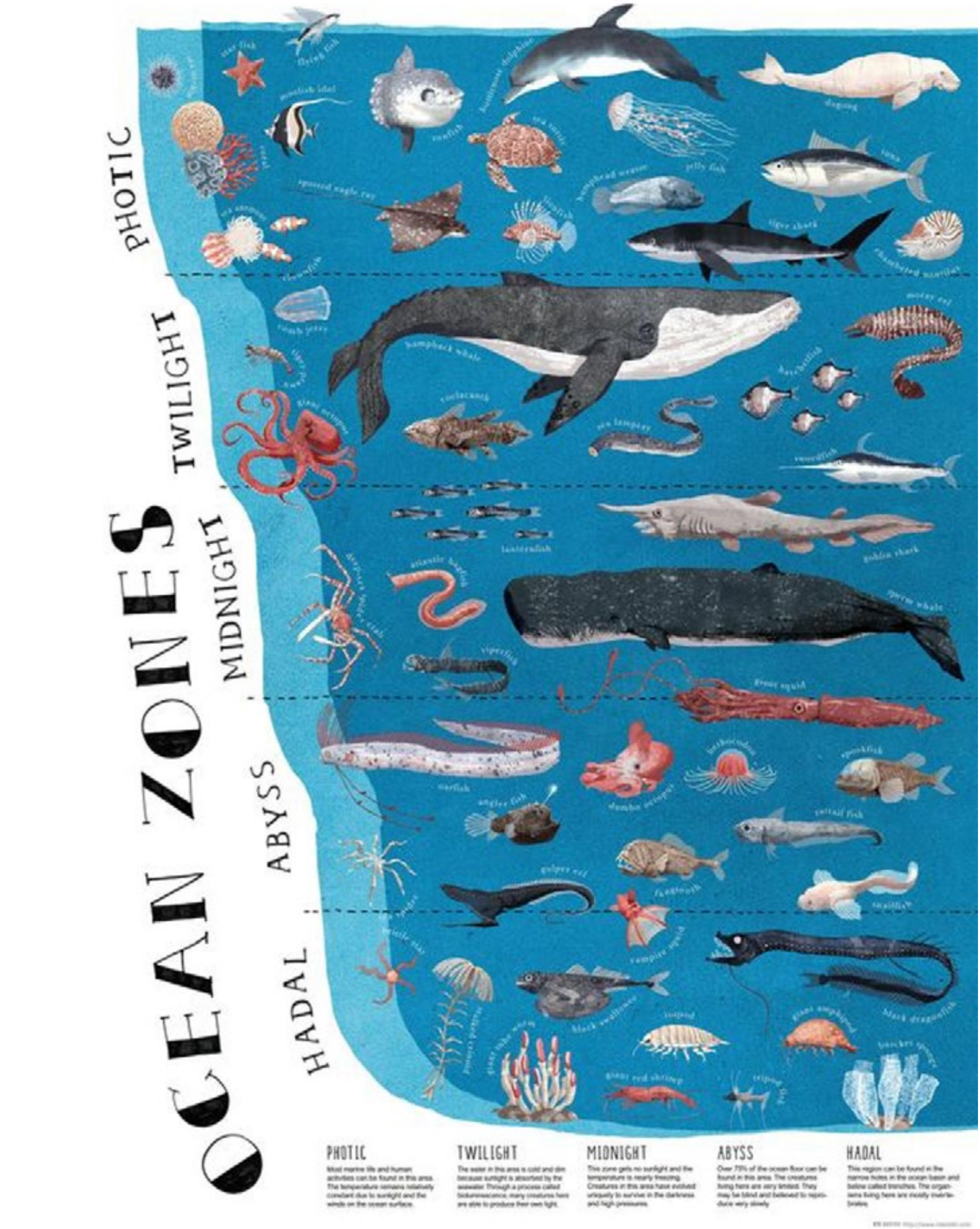
Activity instructions: Saltwater distillation experiment

Equipment:

- Large bowl
- Mug of heavy cup
- Water
- Ice cubes
- Salt
- Plastic wrap or garbage bag
- Rubber bands or sticky tape



Set up the equipment as shown in the diagram. The salty water should be in the bowl, use hot water to speed up the process. The empty cup is sitting in the salty water in the bowl. The plastic covers the top of the bowl and is sealed by the rubber bands or sticky tape. The ice cubes are on top of the plastic and should cause the plastic to dip slightly over the top of the cup. Watch as the water evaporates, condenses on the plastic and then runs into the cup. Taste the water collected in the cup, it should be fresh (if your plastic is clean)! This will still work if you start with cold water in the bowl and use a weight instead of ice on top of the plastic, but you might have to wait hours or days to see the results.



PHOTIC

Most marine life and human activities can be found in this area. The temperature remains relatively constant due to sunlight and the winds on the ocean surface.

TWILIGHT

The water in this area is cold and dim because sunlight is absorbed by the seawater. Through a process called bioluminescence, many creatures here are able to produce their own light.

MIDNIGHT

This zone gets no sunlight and the temperature is nearly freezing. Creatures in this area have evolved uniquely to survive in the darkness and high pressures.

ABYSS

Over 75% of the ocean floor can be found in this area. The creatures living here are very limited. They may be blind and believed to reproduce very slowly.

HADAL

This region can be found in the narrow holes in the ocean basin and below called trenches. The organisms living here are mostly invertebrates.