



The aim for our learners from Yr 1-12 was to support them to carry out real life and valid investigations using a variety of approaches: classifying and identifying, pattern seeking, exploring, investigating models, making things, developing systems. We registered with the Mm2 Programme in 2017/2018 and with the support and assistance from Dr Mels Barton began our investigation. Our community at A.G.E. including students, Learning Coaches and parents have been activity engaged in this passion based learning journey.

Below are a collection of our students reflections, recount and a report in regards to their learning through the Mm2 Programme.

### **Reflections from Yr 1- 6 students**

Taking part in the Mm2 Programme I have learnt that we do not have many encrusting orange sponge *Hymeniacidon perlevis* on our rocky shores. These sea creatures need to be found on other beaches throughout Auckland not just at Takapuna Beach so that they can keep evolving.

The Mm2 Programme is so good. I got so excited when I discovered the sea slug. It looked amazing! I really I feel good about how clean our rock pools are knowing that we have a Gem Nudibranch *Dendrodoris gemmacea*.

Completing the Mm2 programme has taught me that Takapuna Beach is a good area for sea life because we have discovered so many endangered species here that are not found at other places. I do not like the amount of rubbish that we pick up each time though. I wonder how sea animals feel living in it?

Learning that there are many endangered sea creature species in New Zealand makes me feel sad and mad because there will not be many left when I am older. The endangered sea creatures that we found at our beach should be everywhere. It is really important that we find other ways to stop runoff from polluting our streams and beaches.

During Mm2 I really liked learning about crabbing. I go crabbing a lot with my family. It's great having crab races. You find crabs under rocks, there are many at Takapuna Beach. To pick up crabs you need to hold their bodies and then their pincers can not pinch you. You can find paddle crabs and they are really yummy to eat.

Completing the Mm2 programme has made me aware of all the rubbish on the beach. It is so stupid! Why do people drop rubbish? Why can they not take it home and recycle it?

I feel so sad for the world. We should take care of our Earth every day. There is too much rubbish found on our beaches. How do our sea creatures survive?

The ocean feels so bad. Why do we just drop rubbish? Maybe we do not see rubbish bins. We should take our rubbish home and recycle it!!!! We should recycle carefully.

The oceans are so sad because of all the rubbish. Why does our Earth need to have rubbish? We need to recycle. We need to reduce, reuse and recycle NOW!!!

Why are we not kind to our planet? Why do we dump rubbish when they think no one is looking?

Do not dump rubbish on our streets, it blows straight into the drains that go out to our oceans! I feel so sad when I see all the rubbish at the beach and at our parks and on the streets. I feel really sad for the oceans and our planet because of all the plastic EVERYWHERE!!!

What happens when you drop rubbish? Pollution that's what happens!!! All that rubbish is a problem!!! Can we recycle metal and plastic that is ruining our oceans? The answer is NO right now and not fast enough!! So what do we have to do? Maybe we could make a plastic factory that melts it down and turns it into something else? Maybe we could get money for returning plastic back?

I feel frustrated, scared and sad that people do not understand how bad it is to dump rubbish. More flora and fauna will die in the future before we manage to solve the problem. Creatures and plants are dying all over the world because of human thoughtless actions!!!! Save the WORLD!

**Real-life passion-based learning** - collaborative recount from the Orenda, Mad'ouk Learning Pod's.

Takapuna Beach was crawling with curious creative citizen scientists surveying the plants and animals living in the rock pools. These inspiring youngsters, from A.G.E., monitor the seashore as a part of the Marine Metered Squared programme created by Otago University.

Three endangered species were identified: the Gem Nudibranch *Dendrodoris gemmacea*- sea slug, *Microzonia volutina* - an endemic (unique to NZ) seaweed and the encrusting orange sponge *Hymeniacidon perlevis*.

Dr Mels Barton, exclaimed, "A great days work today. I was very pleased with how it went & how excellent your site is."

Take note readers Takapuna rock pools have a wide range of endangered sea life and this is to be celebrated!



Gem Nudibranch *Dendrodoris gemmacea*. Photo: Mels Barton

A senior student left the rock pools feeling nostalgic and uplifted. He reflected that when he was young he loved exploring the sea and had dreams of becoming a marine biologist. However with the way that the schooling system operated he did not have the opportunity to take part in these life long learning activities. On Monday this all changed with the excited teens discovery of new creatures to be included in the Mm2 database. He is now undertaking research into why Takapuna Beach has such a diverse range of plant and animal life in comparison to other Auckland beaches. Passion based learning at its very best!

Interested in learning more? Take a moment to join the Marine Meter Squared project – it's easy and free. <https://www.mm2.net.nz/>

### **An aggressive pest: Mediterranean fan worm – (sabellidae) *Sabella spallanzanii*** **Written by Luke Lim**

On the winter day of June, the 10th, a small number of students ventured to the Takapuna rock pools by the beach to conduct a survey on the life that was in a 1-meter by 1-meter square.

Most of the juniors, two middle school students and a senior student set up shop and began searching. I was excited just to be there so I began searching thoroughly when I came across what appeared at the time as an oddly straight stick swaying in the water not floating away. I dismissed it and kept searching. When the marine biologist supervising us came to help and check what I had listed, she exclaimed that the odd stick was, in fact, a Mediterranean fan worm, an invasive species that harm ecosystems by outcompeting filter feeders for food.

So who found the worm? I did. Who am I? I am a senior student at A.G.E., Luke Lim. Anyway, what are they? And why do they have such a huge impact? Well, that's what I hope to explore.

Let's look into their reproduction before anything else. How do they multiply? Male Mediterranean fan worms release sperm into the water to be captured by females. The fertilisation process takes place inside the female worm's tube, where the egg is released. Mature female worms are able to produce more than 50,000 eggs during each spawning event. The spawning event occurs over a time of around autumn-winter and the females aren't restricted to a single batch of eggs during this period of time. This reproductive process is influenced by environmental conditions, water temperature and light exposure respectively. The larvae drift in the water for up to 14 days. If these worms are damaged they are able to regenerate parts while the worm continues to function, much like the regenerative properties of axolotls. I believe this makes eradicating these worms not feasible simply due to the fact that it can't be killed using physical means and has a large population. It suggests either a different physical way to kill it or use a chemical means instead.

What do they look like? Why are they a problem? Where do I look for them?

The worms themselves are tube dwellers, in tough, mucous tubes, coated with sand, mud and debris. The main head has feather-like tentacles on either side of the mouth part. These tentacles are called radioles and shape a crown, controlling both the feeding and respiratory functions. Their width can get up to 150mm. The tube can get to over 40 cm and have a leathery, flexible and muddy-looking. They pose problems for ecosystems if left unregulated as they outcompete filter feeders by altering water flow for suspended food. They're also annoying because they stick to a wide range of surfaces varying environmental conditions. Its fast rate of growth, and its prolific breeding habits make it particularly aggressive in its competition for food. It has no known predators in New Zealand and has high amounts of heavy metals in the crown which leads me to believe it might be a potential anti-predatory strategy. They're generally found on the hull of pretty much any kind of boat due to their ability to stick to so many surfaces.

If you're feeling adventurous, how about a trip to the rock pools? Look around hard sub-tidal structures and small buried fragments of shell or rock. If unsuccessful at first, they could be buried up to 10cm deep in soft substrates or anywhere in shallow subtidal areas in the depth range of 1 – 30m deep so don't feel so bad.

What can we do to at least prevent such a tyranny?

If you own any kind of boat such as ferries, yacht, a regular old fishing boat, a rundown rowboat or a huge naval battleship, make sure to clean the hull regularly to the extent of having no more than a light slime layer. Apply thorough coatings of antifouling paint and keep it in good condition. Having a good look at your hull and clean out any fouling before you travel to a new region. Don't forget to clean and dry any marine equipment before setting sail to the new region as well. Look carefully for marine life in compartments on your boat that hold water. Finally, check anchors, propellers and any other sort of equipment for tangled seaweeds.

You must notify the Northland Regional Council if you think you have seen this pest outside of Whangarei Harbour.