

# Plastics in the Marine Environment

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**Grade Level:** 4-10

**Program Length:** 60-90 minutes

**Goals:** To create awareness about marine debris and the north pacific gyre. To encourage students to consider their use of single use plastic.

**Objectives:**

- Students will learn about the natural history and ecology of the Laysan Albatross
- Students will learn how plastic waste enters the ocean by learning about the North Pacific Gyre
- Students in small groups will discover how plastics affect marine animals by dissecting Albatross Boluses

**Materials:**

- Power point presentation from PTMSC
- Class set of albatross boli, on loan from PTMSC
- Dissecting forceps
- Cups or containers for sorting
- Hand lenses
- Transparent glass vase or jar full of plastic debris
- Examples of single use plastic and alternative packaging

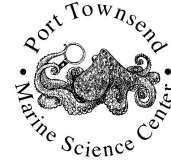
**Introduction to the Laysan Albatross**

The Laysan Albatross is a large seabird that ranges across the North Pacific. While it's wingspan is quite large at 7 feet, it is one of the smaller species of Albatross. The

Laysan Albatross has a wide range across the North Pacific with 16 nesting sites. Its main breeding colonies are in the Hawaiian Islands, particularly the islands of Midway and Laysan. The Laysan Albatross is colonial, nesting on scattered small islands and atolls, often in huge numbers.

Outside of breeding season, albatross live their lives at sea – eating and sleeping without touching land. Laysan Albatross Juvenile birds return to the colony three years after fledging, but do not mate for the first time until seven or eight years old. During these four or five years they form pair bonds with a mate that they will keep for life.

Courtship entails especially elaborate 'dances' that have up to 25 ritualized movements. They were once commonly known as Goonie birds because of this goofy mating dance.



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A female lays a single egg each year. Both birds incubate the egg; the male does so first. Incubation takes about 65 days, and is followed by several weeks of brooding, after which both parents are out at sea to provide for the growing chick. The chick takes about 160 days to fledge. This time investment by the parents may explain the long courtship; both parents want to be sure the other is serious.

Laysan albatross are not known to be picky eaters. While they have a preference for squid and fish eggs, they will ingest many items floating on the surface of the water. To find out what albatross eat, scientists look at boli (plural for bolus). A bolus is a pellet – like an owl pellet, of indigestible items left that the bird has gotten rid of. Dissecting a bolus lets us peek into the diet of an albatross.

### **Bolus Dissection:**

#### **Rules of dissection.**

- **Every single tiny little bit of bolus** need to make it back into the bag by the end of the lesson. PLEASE!
- All parts of the bolus stay on the tray or in the cups
- If you find something cool or unknown, bring someone to your tray, rather than bringing the thing to the instructor.
- **PLEASE be gentle with the squid beaks!!!** They break very easily.

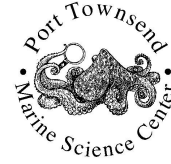
Hand out dissecting instruments to each table. Have the students place the contents of one bolus bag onto each a tray. Encourage students to touch the particles and use hand lenses in order to determine what they are finding.

Check in with the groups as they discover objects in their bolus. How are they categorizing the pieces? Make sure they correctly identify the plastic debris as plastic. White fragments of plastic often look like shells, for example. In this case, the weight and the smooth feel gives the object away as plastic.

Once time is up or interest wanes, begin discussing what students found in the boli.

### **North Pacific Gyre:**

Upon discussing the contents of the boli with your class, students will have commented on all of the plastic their albatross has ingested. Now comes the time to introduce the North Pacific Gyre. Point out the map of the gyre, the direction of the currents and the location of the Laysan Albatross nesting sites.



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### Albatross Chick Stomach Demonstration

Present the students with the empty jar, which represents the albatross stomach. Place a piece of plastic at a time into the jar, asking the students how one more piece might affect the albatross, keeping in mind that an albatross *chick* is unable to produce a bolus until it fledges. As the 'stomach' fills, there is less and less room for actual food. Many albatross check stop foraging, grow slowly, and many die due to starvation and dehydration, as their stomachs are too full of trash to make any room for food.

Albatross aren't the only marine animals that are affected by plastic trash in the ocean. Sea turtles mistake plastic bags for jelly fish, and choke on them. Zooplankton eat the tiny fragments of plastics, and then the plastic pieces are sent up the food chain. Other animals become entangled in plastic, keeping them from moving about – escaping predators or catching prey.

Why is it that plastic trash is so prevalent in our oceans? First, plastic does not biodegrade, like a banana peel. It breaks into smaller and smaller bits, but remains a plastic polymer, never to be 'recycled' into usable molecules. Also, we humans are making and using more and more of it everyday. In fact, most plastic in the ocean, 80% of it, scientist estimate, come from land – our towns and cities!

What can be done about all of this?

### Packaging Demonstration

As a consumer, everyone has an opportunity to choose products that are better for the planet. For example, people can choose food that uses less packaging. (*Show single cereal box packaging vs. individual cereal box packaging, or other example*).

Ask the students other things they can think of to buy in bulk vs. individually wrapped? What some other ways they can choose to use less plastic in their lives?

### **Action Plan:**

What can your class or your school *realistically* do to prevent the albatross from swimming in an ocean of plastic? Come up with a plan, then follow through with it. Maybe banning plastic forks from the lunch room or conducting a beach clean up... The possibilities are endless!