

Macroplastics station. Bolus Dissection and analysis

Introduction / Why is it important?

Today we are going to be observing and examining **boluses**. **Bolus** is a word that means the clump of material found inside the stomach of a bird. These boluses are from birds that were found dead and scientists wanted to open them up to examine and discover why they died. Much like an autopsy that is performed on humans after their death to learn about what killed them, especially if it is a disease.

Today, you are going to be one of those scientists and doctors! The boluses we have are from Pacific island albatrosses, which is the bird with the longest wingspan in the entire world! Their wings can be up to 11 feet wide, which means if we both hold our arms out and stand side to side, one albatross will still be wider than both of our wing spans combined! These albatrosses have been recorded transverse and the planet 14,000 km without returning to land. The albatross had a special significance to sailors for hundreds of years as well, because their enormous wings allows them to fly farther from land than any other bird, so spotting an albatross could mean the first sign you were getting close to land after spending months on the ocean. We want to protect these unique birds likely do other animals that face human impacts and possible extinction. So let's look at what we can find in their stomachs and see if we can discover any clues about how or why they died. Don't worry, these have been sanitized so there won't be any gross stomach stuff, only the organisms (**biotic**- living matter, or **abiotic** (nonliving) material that they ate.

Procedures

Divide students into teams based on the number of people and number of boluses, ideally to per bolus. Give them tweezers to pick the boluses apart and two bowls to separate what they find. One bowl for **biotic** matter and the other for **abiotic**. Tell them to start by opening up or sifting through the bolus and removing anything that they think is made by humans (such as plastic or fishing line, etc.) into one bowl on the side. Some objects may be obvious, but some may require some examination and thinking to decide what it is. Have them work as a team. This is a cooperative learning activity. To check if something is made of plastic, have youth drop it into a small cup of water. If it floats, it's plastic; if it sinks, it may be a rock or bone or something else. Ask students if anyone knows what density is. Have them describe **density** and why many plastics float. (You can fill in on the explanation).

After they have finished sorting the bolus, ask them questions about what they found inside.

What did they find that was part of what food they probably ate (fish)?

What did they find that wasn't food?

What were they surprised to find? What percentage do they think of the bolus was human-made?

How do they think the objects ended up in the bird's stomach?

Was there anything dangerous to eat? Was there anything you wouldn't want to eat, and why not?

Close by asking students to come up with a theory with their team about why the albatross died, and then have each team share what they decided.

Tell them that sometimes fish eat pieces of plastic because they look like food, and then birds eat the fish. Plastic floats, so sometimes when birds are scooping up water with the fish they eat, they will accidentally eat plastic as well. After these abiotic objects get eaten, the birds can't digest them, so they stay inside the birds' bodies. Eventually, if birds get too much plastic inside, they feel like they can't fit any fish in their belly and don't eat, and die of starvation. An important example are the little components of Styrofoam. Small Styrofoam balls that look exactly like fish eggs

It's important to take precautions so that our trash doesn't end up polluting natural environments like the ocean, rivers or land. 80% of pollution in the ocean actually comes from land, objects that have washed out to sea with the rain, including from city streets by way of the sewers. (S students how many have seen the signs painted near sewers that say "**no dumping. Flows directly to ocean.**") So, if we don't take care of the land, the sea will be polluted, and we will be putting birds and other animals at risk. And because some of these human-made items take a long time to **biodegrade**, as they will learn (or already learned) in another station, these items can even affect many animals over a long period of time. Including humans especially youth and pregnant women. Plastics break down into **polymers** which mimic hormones, this they become **endocrine system** disruptors especially for pregnant women, youth and adolescents.